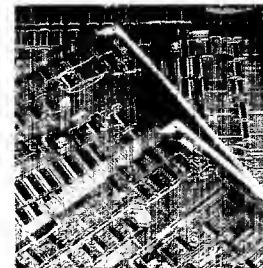
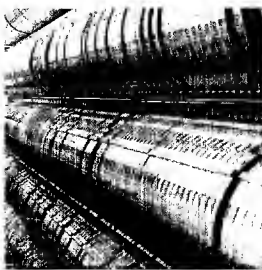
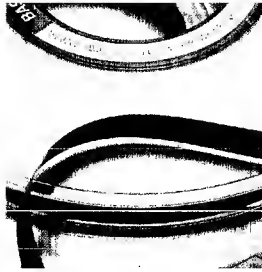


Prime Computer, Inc.

MRU4304-008
Software Release
Document
Revision 19.0



Software Release Document

MRU4304-008

Revision 19.0

by
James Craig Burley

This document contains information on technical changes and enhancements made to Prime user software after Rev. 18.3 and released at Rev. 19.0.

**Prime Computer, Inc.
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PRINTING HISTORY — SOFTWARE RELEASE DOCUMENT

<u>Edition</u>	<u>Date</u>	<u>Number</u>	<u>Documents Rev.</u>
	July, 1981	MRU4304-005	18.2
	January, 1982	MRU4304-006	18.3
	July, 1982	MRU4304-007	18.4
	August, 1982	MRU4304-008	19.0

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PART I
Overview

CHAPTER 1

INTRODUCTION

REV. 19.0 SOFTWARE RELEASE DOCUMENT

This document provides an overview of technical changes and enhancements to Prime user software for Rev. 19.0. It describes these changes and enhancements in relation to Rev. 18.3. (For full information on Rev. 19.0, see the documents listed at the end of this chapter.)

This guide contains information on the following topics:

- New software products
- New system capabilities
- Global changes
- User-visible enhancements and changes made to existing products
- User-visible software problems that have been fixed

The remainder of Chapter 1 provides information on the following topics:

- Overview of Rev. 19.0
- New Prime technical publications

NEW SOFTWARE PRODUCTS AND CAPABILITIESFile Transfer Service

Rev. 19.0 introduces one major new product -- File Transfer Service (FTS), a utility for transferring files over a network.

This new utility allows users to transfer files among Prime computers. The user is able to monitor and control his transfer requests via a new command, FTR. Full information on FTS is found in the PRIMENET Guide.

New System Capabilities

Rev. 19.0 also introduces several major new system capabilities:

- Access Control Lists
- New Command Processor
- Quotas on Disk Storage
- New File Manipulation Utilities
- User Registration and Profiles
- New Disk Format
- New FIX_DISK Program, which replaces FIXRAT

Access Control Lists: More flexible protection mechanisms now exist for files and directories. A user who owns a file can set up an Access Control List, or ACL, which describes who may access the file or directory, and to what degree. Additionally, the user may prevent certain users or all users from accessing the file at all. This capability is an alternative to the old directory password mechanism.

New Command Processor: The PRIMOS Command Processor has been enhanced to allow greater flexibility and ease-of-use for users. It has the ability to perform commands repeatedly over a set of files specified by the user; yet the user need only specify the command and its arguments once.

Quotas on Disk Storage: The System Administrator now has the ability to control disk usage on a per-UFD basis. Additionally, users can limit themselves by setting quotas on their sub-UFDs.

New File System Utility: The FUTIL utility and LISTF command have been replaced by a series of new commands, collectively referred to as the File System Utility. These commands can be used with the new command processor, resulting in powerful capabilities for the user via an easy-to-use interface. FUTIL and LISTF are still available, though they do not support all of the new command processor features.

User Registration and Profiles: Although Access Control Lists allow users to prevent unauthorized access to their files, security must exist to prevent unauthorized access to the system, or ACLs are rendered ineffective. The new User Registration system provides the necessary security. Additionally, it provides the System Administrator with greater flexibility in creating, modifying, and deleting users who can log in to the system.

New Disk Format: Because of ACLs and Disk Quotas, a new disk format now exists. Pre-Rev. 19-format disks can be used on Rev. 19 systems, though they cannot employ the new ACL mechanism or have disk quotas on them. Rev. 19-format disks should not be used on pre-Rev. 19 systems.

Additionally, the new disk format allows better handling of bad spots on the disk. Rather than marking entire tracks as invalid, only the bad records will be so marked.

GLOBAL CHANGES

There are two changes that are global in nature:

- User names can now be up to 32 characters long.
- The sizing of disk records is now done in 2048-byte records rather than in 880-byte records.

The new username length of 32 characters is a PRIMOS change and is related to the new User Registration and Profiles mechanism. Several products that use user names were changed to support the new 32-character length. These include BATCH, SPOOL, DBMS, DBMS/QUERY, and PRIME/POWER.

The change in record size entails changes to AVAIL, FUTIL, SIZE, and SPOOL. AVAIL, FUTIL, and SIZE may be requested to use the old 880-byte record size, by specifying the option -NORM on the command line. New programs that report file sizes, such as LD, do so in the new 2048-byte record size.

USER-VISIBLE ENHANCEMENTS AND CHANGES MADE TO EXISTING PRODUCTS

Enhancements and changes that are visible to users have been made to the following software products:

AVAIL	PRIME/POWER
BATCH	PRIMENET
COPY_DISK	PRIMOS
DBG	RJE
DBMS	SEG
DPTX	SIZE
LOGPRT	SPOOL
MAGSAV/MAGRST	SUBROUTINES
MIDAS	VFTNLIB
PHYSAV/PHYRST	

PROBLEMS FIXED

Problems in the following products have been corrected:

AVAIL	MAGSAV/MAGRST
BASIC/VM	MAKE
BATCH	MIDAS
CMPF	PASCAL
CPL	PHYSAV/PHYRST
DBG	PRIME/POWER
DBMS	PRIMENET
DBMS/QUERY	PRIMOS
DPTX	PRIMOS II
EDITOR	RJE
FORMS	SEG
FIN	SPOOL
FUTIL	SUBROUTINES
LOAD	VFTNLIB
LOGPRT	VRPG
MAGNET	

NEW BOOK TITLES

The following new technical publications are now available.

Subroutines Reference Guide (DOC3621-190)

This book documents Prime subroutines (both operating system and library) that are not tied to a specific product. (MIDAS, PRIMENET, and DPTX subroutines are covered in their respective books.) Subroutines are organized by function — file system access, matrix operations, sorting, high-level user applications, etc. A discussion of how to pass data types between subroutines written in BASIC/VM, COBOL, FORTRAN, FORTRAN 77, Pascal, PL/I Subset G, and PMA, is presented in a series of chapters, on a one chapter per language basis. The binary editor, used for building libraries, is documented here. An alphabetical listing of subroutine names also includes a brief description of each subroutine.

Prime User's Guide (DOC4130-190)

This book assumes some programming background in a high-level language. It does not assume any familiarity with Prime equipment or software. This is the first book used to introduce a programming user to the system. It introduces the new user to PRIMOS, Prime's operating system, and to Prime's file system, utilities, compilers, and subroutine libraries. Tutorials center on that small portion of the software that does most of the application programmer's work. Cross references tell the user where to find out about the rest of the software.

CPL User's Guide (DOC4302-190)

This book is intended for any user of Prime systems who wants to use Prime's Command Procedure Language. A knowledge of high-level language programming concepts is assumed. Familiarity with Chapters 1 to 3 of the Prime User's Guide is helpful. This book contains both a carefully structured tutorial, and a complete reference guide to CPL.

PRIMOS Commands Reference Guide (FDR3108-190)

This book is intended for all users of Prime computers. A general knowledge of the system is assumed; specifically, the user should read the Prime User's Guide. The PRIMOS Commands Reference Guide is essentially a dictionary of all commands recognized by Prime's operating system, PRIMOS. It is a logical extension of the Prime User's Guide for applications and systems programmers, as it offers full details on both common and rarely-used commands.

Rev. 19.0 Planning and Installation Guide (DOC6426-190)

This guide is intended for the user who is responsible for the installation of Rev. 19.0 Prime software. The manual contains an overview of Rev. 19.0 with step by step instructions for the user who is installing PRIMOS for the first time, and for the user who is converting from a previous version of PRIMOS. Knowledge of the Prime system and of computer-room operations is essential. In conjunction with this guide, the installer should also read suggested chapters from other Prime documents, including the System Administrator's Guide, the System Operator's Guide, and the Prime User's Guide. In addition to information on installation and conversion procedures, the Rev.19.0 Planning and Installation Guide contains information on planning for Rev. 19.0, on planning for networks, on backup procedures, and on Rev. 19.0 enhancements of interest to applications programmers already familiar with Prime software.

System Administrator's Guide (DOC5037-190)

This book is intended for System Administrators working with Prime equipment. A general knowledge of computer-room operations is strongly recommended. This book is not intended for use by general computer room operating personnel. It provides commands, techniques, strategy, and advice for configuring, resource allocation, and administration of Prime systems and networks.

System Operator's Guide (DOC5038-190)

This book is intended for all computer room operators of Prime equipment. No background is required, although some familiarity with Prime hardware and with PRIMOS is desirable. The book covers all daily computer room techniques and commands. This includes system startup and shutdown, disk formatting, system backups, halt handling, system monitoring, line printer operations, and record keeping.

PRIMENET Guide (DOC3710-190)

This book is intended for people (users, operators, programmers, and System Administrators) using the network. General users need only know basic PRIMOS commands. Programmers are expected to know Prime's FORTRAN IV (FTN) or PL/I Subset G. The book explains PRIMENET, including remote login and remote file access, for users, operators, and programmers. It describes networks, network connections, network operations, and operator use. It also covers NETLINK, FAM II, and FTS and explains interactions with X.25 public data networks and other X.25 connections. It shows operators how to maintain FTS, and it contains a network subroutines reference guide, including examples and hints for programmers.

Remote Job Entry Phase II Guide (DOC6053-190)

This book is intended for users (both system operators and administrators) of RJE emulators. The user should be acquainted with the RJE system (IBM, CDC, etc.) being emulated as well as with Prime's editor (ED) and other basic PRIMOS commands. This book documents Prime's Remote Job Entry emulators for HASP, 2780, 3780, CDC 200UT, Univac 1004, Honeywell GRTS, and ICL 7020. This book defines and describes emulators, and it provides instructions on job submission. This book also provides information for operators who must set up and maintain remote job entry facilities, and it contains a dictionary of emulator commands.

REVISIONS, UPDATES, AND CORRECTION SHEETS TO EXISTING BOOKS

The following revisions, updates, and correction sheets to existing books are now available.

LOAD and SEG, Rev. 19 (PTU2600-083)

PL/I, Subset G, Rev. 19 (PTU2600-084)

Source Level Debugger, Rev. 19 (PTU2600-085)

Pascal, Rev. 19 (PTU2600-086)

DBMS, Rev. 19 (PTU2600-087)

DBMS/QUERY, Rev. 19 (PTR2600-088)

MIDAS, Rev. 19 (PTU2600-089)

POWER, Rev. 19 (PTU2600-090)

FORMS, Rev. 19 (PTU2600-091)

DPTX, Rev. 19 (PTR2600-092)

RPG II V-mode Compiler, Rev. 19 (PTU2600-094)

Magnetic Tape User's Guide Update, Rev. 19.0 (UPD5027-190)

COBOL Reference Guide Update, Rev. 19 (COR3056-002)

FORTTRAN Reference Guide Update, Rev. 19 (COR3057-002)

BASIC/VM Programmer's Guide Update, Rev. 19 (COR3058-002)

New User's Guide to EDITOR and RUNOFF Update, Rev. 19 (COR3104-002)

CHAPTER 2

SYSTEM ADMINISTRATOR

NEW FEATURES

Because of the magnitude of changes to Rev. 19.0, it is highly recommended that System Administrators read all of Part II in this book. Additionally, portions of Part III, especially including the chapter PRIMOS AND UTILITIES, should be read. Most of the major changes to the system directly affect the way System Administrators will perform their duties.

The following is a short summary of the major new features that are important to System Administrators.

Access Control Lists: System Administrators must decide whether or not to use ACLs and, if ACLs are used, on which disks they will be used. System Administrators will be responsible for setting the Access Control List for each of the ACL disks on their systems. Additionally, System Administrators must set the initial Access Control List for each top-level directory unless they choose to allow the directory to default to the ACL for its partition.

Disk Quotas: Again, it is up to System Administrators to decide whether use of disk quotas is appropriate for their systems. If they decide to use disk quotes, System Administrators must set the appropriate maximum quotas on all top-level directories whose disk usage is to be limited.

User Registration and Profiles: A primary function of System Administrators is to manage users on the system or systems. The new User Registration capability is intended primarily for System Administrators to regulate use of their systems to only those people who are authorized. Additionally, System Administrators will decide whether they want to group users together into projects, under the care of Project Administrators. If they decide to use this feature, they must define the projects and decide who is to administer them.

New Disk Format: Although the existence of the new disk format does not by itself affect System Administrators, except as discussed above regarding ACLs and Quotas, there is a new utility to repair disks, named FIX_DISK, that may change the way off-line system activities are being done. FIX_DISK cannot run under PRIMOS II, unlike its predecessor, FIXRAT. FIXRAT must not be used to fix a Rev. 19 disk. Therefore, any installation that is currently running FIXRAT under PRIMOS II will need to change its procedures so that FIX_DISK can be run under PRIMOS instead. This change will involve decisions made by System Administrators.

File Transfer Service: The System Administrator whose system will make use of the new File Transfer Service (FTS) will have to grant FTS servers and the FTS manager certain access rights via the Access Control Lists mechanism. See the System Administrator's Guide for more information.

ENHANCEMENTS

Other changes to the system that may affect System Administrators are also explained fully in this book. These changes are summarized below, on a program-by-program basis.

PRIMOS: A new one-step boot allows a complete coldstart with a single "BOOT" command at the console. A change in paging space allocation can result in more optimal use of the paging disk and a higher availability of segments. A new event logging mechanism exists, which allows greater control of event logging.

Batch: A new data base initialization sequence is in place. More Batch queues can be defined. The Batch monitor startup sequence has been changed, making startup entirely automatic. The initial default and maximum values for CPU and elapsed time have been changed. Force logouts are now handled by the Batch monitor. The monitor's log file is more readable.

COPY_DISK: A performance improvement, which requires specification of a command line option, has been made. Messages that were output to inform the user of the progress of COPY_DISK are no longer output.

LOGPRT: The location of the event log files for both system and network events has changed. There are eight new event types, three system events, and five network events.

MAGSAV/MAGRST: A new option, allowing easier use of MAGSAV and MAGRST from command files, now exists. A new option that changes the way incremental saves are done has been added. Error handling and recovery has been improved. An old option and command have been removed. Undocumented abbreviations of command line options no longer work.

PHYSAV/PHYRST: A performance improvement, which requires the specification of a command line option, has been made.

SEG: The SPL library is now automatically loaded with the Fortran library, therefore the SPL library must be present on the system.

SPOOL: The spooler has more EVFU support. PROP has an improved method of handling commands that specify numeric parameters.

Subroutines: A new subroutine allowing programmed assignment of AMLC lines exists in PRIMOS. Another new subroutine, which allows a phantom to be started up on a CPL file in addition to a command input file, has been added.

DBMS: When most types of fatal errors occur, the CLUP program is now automatically run. AREA files are now dynamically packed.

MIDAS: The REMAKE and REVERT utilities are not present on the master disk.

PRIME/POWER: A conversion utility has been included on the master disk. POWER now supports the Prime PT65 terminal.

RJE: A single operator can now control more than one emulator at a time. Files can now be submitted from within a user program. Modem speeds of up to 56 kb are supported for the X80 and HASP emulators. A new emulator, XBM, now exists.

PART II

New Systems

CHAPTER 3

ACLS — ACCESS CONTROL LISTS

INTRODUCTION

Perhaps the most significant piece of new functionality at Rev. 19 is the addition of Access Control Lists (ACLS) to the file system. It has been recognized for some time that the old password protection mechanism is inflexible and inadequate. ACLs provide flexible and powerful protection for file system objects. This protection is passive; a user who is authorized does not need to do anything special to achieve the authorization. With the old password mechanism, an authorized user had to specify a password to achieve authorization.

To use ACLs, disk partitions must be converted to Rev. 19 format. This is done using a new utility, `FIX_DISK`, which will be described in Chapter 9.

Disks that are not Rev. 19 format will continue to be supported, but cannot make use of ACLs. On Rev. 19-format disks, passworded directories will still be supported, but they may be converted to ACL directories on an individual basis, using tools that are provided on the Master Disk.

An Access Control List is used to limit access to a file system object by a user or group of users. It can be applied to a file, a segment directory, or a directory. In addition, a new file system object called an access category can be created. It contains an Access Control List. Groups of files, segment directories, and directories may be protected by a single access category. This permits quick changes to the access for groups of files.

To support both the new ACL mechanism and the old password mechanism, file directories (UFDs) are now of two types -- password directories and ACL directories. A password directory is protected using the old password mechanism; it has owner and nonowner passwords, but it may not contain access categories or ACL directories. An ACL directory is protected using the new ACL mechanism; it may contain access categories or password directories, but it is not itself protected by owner or nonowner passwords. If a password is specified in an attach to an ACL directory, it is ignored.

Sometimes the System Administrator requires special access to the file system. Performing system backups is a typical example. In cases where special access is required, Priority ACLs may be used to supercede access rights granted in the file system itself.

Priority ACLs override both ACLs on ACL directories and passwords on password directories. A Priority ACL affects an entire disk partition or partitions. When an attempt is made to access a file on a partition protected by a priority ACL, PRIMOS will check the priority ACL first, to see if the user is listed therein. If not, it will then check the access permitted by the file itself, as it would if no priority ACL were present.

Priority ACLs may be added or removed while users are logged in to the system.

COMMANDS

Several new commands have been added to PRIMOS specifically to support ACLs:

SET_ACCESS	Protects a file system object with an ACL, an Access category, or the default protection. Also used to convert a password directory to an ACL directory.
LIST_ACCESS	Lists the access for a file system object; lists whether the access comes from an access category, a specific ACL, or a default access.
EDIT_ACCESS	Changes the access for a file system object by updating its ACL.
SET_DELETE	Sets or resets a delete switch for a file; used to prevent inadvertent deletion.
REVERT_PASSWORD	Changes the current directory from an ACL directory back to a password directory.
SET_PRIORITY_ACCESS	Temporarily specifies an ACL for an entire disk partition. This is a system console command.
LIST_PRIORITY_ACCESS	Lists any Priority ACLs set on disk partitions.
REMOVE_PRIORITY_ACCESS	Undoes the effect of SET_PRIORITY_ACCESS.

One existing command has been changed to support ACLs:

CREATE	Has a new command line option that forces the creation of a password directory. If it is not used, the created directory is the same type as its parent directory.
--------	--

PRODUCTS

All products released at Rev. 19.0, except for DBMS and DBMS/QUERY, support ACLs and ACL directories. None of the directories used by DBMS or DBMS/QUERY should be converted to ACL directories, or failures may result.

One product, PRIME/POWER, allows the conversion of its runtime directories POWER* and POWRCM to ACL directories. However, use of ACLs for POWER is not recommended. If ACLs are used, all users who are to use PRIME/POWER must have Read and Write access to all files in POWER* and POWRCM.

Many products make use of temporary files in the user's current directory. Therefore, users who use such products should be attached to a directory to which they at least have DALURW access. Examples of such products include PLI/G, Pascal, and ED.

SUBROUTINES

In PRIMOS, there are many new subroutines that fully support the new ACLs file system. All of the functions performed by the new ACL commands described above can be performed by user programs if these programs use the new subroutines. See the Subroutines Reference Guide for information on these new subroutines.

IMPACTS OF ACLS ON EXISTING PROGRAMS

Certain changes to Rev. 19 software may affect the operation of existing programs. These changes include:

- New rules for attach scans.
- New error codes.

This section describes these changes and suggests methods for handling them.

Changes to Attach Scanning

When a user specifies a treename that begins with "directoryname>", "directoryname passwd>", or issues an "ATTACH directoryname" command, PRIMOS will automatically scan all mounted partitions (MFDs) for the top-level directory called "directoryname".

At Rev. 19, the attach scanning has changed subtly from that of Rev. 18. The differences are summarized as follows:

- Any partition to which the user does not have Use access will not be scanned. It will be ignored. This applies only to ACL partitions. Non-ACL partitions will always be scanned, as was the case at Rev. 18.
- The scanning of disks is now terminated only when the specified top-level directory is found, whether or not the user has access to it, or when there are no more disks to scan. At Rev. 18, scanning would terminate if certain errors occurred during the scan, and this often prevented the user from being able to make a legitimate reference to a file or directory via attach scanning.
- A scan of an MFD to which the user has Use but not List access can only produce an error code of 0 (meaning a successful attach), or E\$NINF (meaning "No information"). Therefore, PRIMOS treats a "No information" as a "Not found". This means that even if the directory exists on that partition, the scanning will continue with the next MFD. This prevents a user from being able to use the attach scan feature of PRIMOS to determine the existence of directories in an MFD to which that user does not have List access.
- If the end of the list of mounted disks is reached, without having found the specified top-level directory, a new error code is returned. Instead of E\$FNIF, "Not found", the error code E\$NFAS, "Top-level directory not found or inaccessible" is returned. All programs that expect ATCH\$\$ and related subroutines such as TSRC\$\$ to return E\$FNIF when the top-level directory does not exist must be changed to expect E\$NFAS, or they may not function correctly. In general, only programs that explicitly check for the E\$FNIF error code will need to be changed. For programs that simply report the returned error code to the user, changes are probably not necessary, although you should be made aware of the new error message.

As with Rev. 18, the order in which disks are scanned is: local disks first, in logical disk order; remote disks afterwards, in logical disk order.

The third difference described above presents what appears to be an anomaly of the attach scanning feature of PRIMOS. If an "ATTACH BREAD" command is issued by the user, and the first MFD in the disk list has a top-level BREAD UFD, but the user does not have Use access to it, one of two things can happen. If the user has List access to the first MFD in the disk list, the error E\$NRIT, "Insufficient access rights", will be generated. If, however, the user does not have List access to that MFD, the scanning will continue, possibly finding another BREAD UFD in an MFD somewhere else.

If the user has Use but not List access to a particular MFD, PRIMOS cannot determine whether the desired directory actually exists on that MFD unless the user has sufficient rights to attach to it. This restriction on PRIMOS stems from the definition of Use without List access on a directory as: "give the user no information on this directory unless the user knows precisely what file, directory, or access category he or she is accessing in it". For any directory to which a user has Use but not List access, including MFD's, the returned error code from operations inside that directory is always 0 (success) or E\$NINF (No information).

PRIMOS cannot tell from the "No information" error code whether the operation failed because the directory did not exist, or because it did exist but the user had no Use access to the directory itself. It therefore assumes that the directory did not exist, so that it can continue scanning other disks.

However, if the user has Use and List access to an MFD, PRIMOS is able to distinguish between a "Not found" error and an "Insufficient access rights" error when it attempts to attach to the specified directory on that MFD. Therefore, the attach scan is only continued if the "Not found" error is returned.

New Error Codes

Primarily because of the introduction of Access Control Lists (ACLs) and Disk Quotas at Rev. 19.0, there are many new error codes.

Most of these new codes are of concern only to the programmer who uses new Rev. 19 subroutines in PRIMOS to manipulate ACLs, Disk Quotas, and other new features. These codes are described in the Subroutines Reference Guide and will not be described in this section.

This section documents those new error codes that may be returned by subroutines that existed at Rev. 18.

Programs that expect specific error codes from subroutines mentioned in the following sections should be examined to see if they need to be adjusted to include these new error codes.

In some cases, the new error codes will be returned only if use of new features (ACLs or Disk Quotas) is made by the system, disk partition, or directory to which the program is referring.

E\$FNAS — "Top-level directory not found or inaccessible"

This error code can be returned by any existing routine that causes PRIMOS to perform an attach scan. It is returned instead of the E\$FNTF "Not found" error code if PRIMOS does not find the top-level directory that is the object of the attach scan. The list of PRIMOS routines that may return this error code includes SRSFX\$, TSRC\$\$, and ATCH\$\$.

Any program that uses these subroutines, or other subroutines that may return this new error code, must be checked to see if they expect the E\$FNTF error code. If so, they must be changed to also expect the new E\$FNAS error code.

E\$NINF — "No information"

This error code can be returned by any existing file manipulation routine, including SRCH\$\$, SRSFX\$, TSRC\$\$, ATCH\$\$, CREA\$\$, CNAM\$\$, SATR\$\$, and GPAS\$\$\$. It can only be returned if the file system object being manipulated is contained (or expected to be contained) in an ACL directory. For SRSFX\$ and TSRC\$\$, the error code can be returned if any part of the treename identifies an ACL directory.

E\$NINF is returned if the user making the call has Use access but not List access to a directory, and an error occurs while PRIMOS tries to access the specified object. Examples of errors include "Not found", "Insufficient access rights", "Not a UFD", and so on. The "No Information" error is substituted for all other errors so that the error message itself will not provide any useful information to a user without proper access rights.

Therefore, programs that check for specific error codes from any of the subroutines listed above will probably have to be changed to check also for E\$NINF. The meaning of E\$NINF, "No information", is: "I have encountered an error, but I do not have sufficient access to determine what the error is". The programmer may have to determine what E\$NINF, when returned by one of these subroutines, will imply to the program.

E\$DLPR — "File is delete-protected"

This error can be returned any time an attempt is made to delete a file that resides in an ACL directory and is delete-protected. Therefore, subroutines such as SRSFX\$, TSRC\$\$, and SRCH\$\$ can return this error code when used to delete files.

Any program that expects those subroutines to return E\$NRIT, "Insufficient access rights", when they are used to delete files (or segment directories) must be changed to also expect E\$DLPR.

However, this is not necessary if the directory containing the file is not an ACL directory. Therefore, a system that does not have any ACL partitions will never return this error code.

E\$IACL — "Entry is an access category"

This code is returned if a PRIMOS subroutine is called to manipulate a file object that must be a file, a segment directory, or a directory, but that is in fact an access category. This includes subroutines such as SRCH\$\$ and SATR\$\$.

However, E\$IACL can be returned only on ACL partitions. Any program that checks for specific error codes returned from PRIMOS subroutines may need to be modified to check for E\$IACL.

CHAPTER 4

COMMAND PROCESSOR EXTENSIONS

INTRODUCTION

The command language and its processor have been extended to recognize several new constructs. These are intended to make it easy to repeatedly execute a command over a set of files or with a specific list of arguments. The changes provide the following general features in the command language:

SIMPLE COMMAND ITERATION	Executing a given command once for each of an explicitly listed set of objects.
WILDCARD PROCESSING	Executing a given command once for each file system object that satisfies certain selection criteria.
NAME GENERATION	Generating file system names from a given name and a pattern on the command line.
TREEWALK PROCESSING	Executing a given command over selected parts of a file system subtree.

Additionally, the command processor allows users to "filter" certain file system objects out of the processing, based on:

MODIFICATION DATE	The system will select a file only if its last modified date and time is either before or after a user-specified date and time.
OBJECT TYPE	The system will select files, segment directories, directories, access categories, or any combination.

Users can also request the system to let them verify each matching file system object before any command is executed.

Combining several of these new capabilities can result in quite powerful operations. For instance, combining treewalk processing, name generation, and wildcards, the user can change the name of all file names ending in .XYZ in an entire directory tree to end in .3D instead.

However, because these new capabilities are automatically enabled, existing programs may have to be changed if they make use of certain option names or special characters on their command line. Any programs that use these options or special characters must either be changed so that they are no longer used, or must be changed to tell PRIMOS to let the programs use the options or characters in the old manner.

IMPACTS OF NEW COMMAND LINE FEATURES ON EXISTING PROGRAMS

Since Rev. 18, PRIMOS has intercepted the following special characters on the command line:

[] % ; ~

The first three are directly related to the Command Procedure Language, CPL; they identify active function and any variable references. The fourth, ;, separates multiple commands on a line (for example, "DELETE FRED;DELETE SALLY"). The last, ~, when occupying the first character position on a command line, tells PRIMOS to not intercept any of the other special characters, that is, to pass them through exactly as typed by the user.

Now, more special characters are being intercepted by PRIMOS. Additionally, some option names are being intercepted. This is being done so that the interface to commands and programs available to users is easier to use.

However, it is possible for a command to request that PRIMOS not intercept some or all of the options and some of the newly-defined special characters. This will be described below.

The following option names (sorted alphabetically) are intercepted by the command processor at Rev. 19.0:

-ACAT	-BOTTOM_UP	-NO_VERIFY	-VFY
-ACCESS_CATEGORY	-BOTUP	-NVFY	-WALK_FROM
-AFTER	-DIR	-SEGDIR	-WALK_TO
-BEFORE	-DIRECTORY	-SEGMENT_DIRECTORY	-WLKFM
-BF	-FILE	-VERIFY	-WLKTO

The following special characters are intercepted by the command processor at Rev. 19.0:

[] % ; ~ (also at Rev. 18)

() @ + ^ =

By prefixing the name of a program in CMDNCO with NX\$ or NW\$, a programmer can tell PRIMOS to not process certain sets of these reserved options and special characters. The NW\$ prefix means "no wildcards or name generation". The NX\$ prefix means "no wildcards, name generation, or treewalking".

If the command name begins with NW\$, the following options are not intercepted:

-ACAT	-BF	-NO_VERIFY	-SEGMENT_DIRECTORY
-ACCESS_CATEGORY	-DIR	-NVFY	-VERIFY
-AFTER	-DIRECTORY	-SEGDIR	-VFY
-BEFORE	-FILE		

If the command name begins with NX\$, no options are intercepted.

If the command name begins with NW\$, the following special character is not intercepted:

=

In addition, the following special characters are not intercepted when they are present in the last component of a treename or in a filename (a token without a ">" character):

@ + ^

However, specifying any of the above characters in certain places in the command line (such as the beginning of a treename) can result in a "Syntax error" message from the command processor, preventing the execution of the command.

If the command name begins with NX\$, the following special characters are not intercepted:

= @ + ^

Therefore, the NW\$ prefix suppresses some interception at the expense of not having PRIMOS automatically perform wildcard and name generation processing. The NX\$ prefix suppresses further interception, at the additional expense of not having PRIMOS automatically perform treewalking processing.

Renaming a command to have one of these prefixes would mean that the prefix would have to be entered in front of the command name to invoke the command. A CPL interlude can be written that, when installed in CMDNCO with the same base name as the original (unprefixed) command, will simply invoke the command with the new (prefixed) name. Such a CPL file might look like:

```
&ARGS ARGS: REST
NX$FARLEY %ARGS%
```

This CPL file would be installed in CMDNC0 as FARLEY.CPL. The FARLEY program would be installed in CMDNC0 as NX\$FARLEY.SAVE. The old copy of FARLEY.SAVE in CMDNC0 would be "removed" (that is, renamed to NX\$FARLEY.SAVE or deleted).

Since the invocation of such commands will appear, to the user, to be the same as Prime-supplied commands, you must inform the users if processing of the command line is nonstandard.

CHAPTER 5

DISK QUOTAS

INTRODUCTION

Before Rev. 19, each user was able to use as much disk space as desired, up to the number of available records on the user's partition. Any one user could seriously impact the ability of other users to get work done.

The addition of disk storage quotas allows the System Administrator to control disk usage on a per-UFD basis. It also allows users to police themselves by setting quotas on sub-UFDs.

To use quotas, disk partitions must be converted to Rev. 19 format. This is done using a new utility, `FIX_DISK`, that will be described in Chapter 9.

Disks that are not Rev. 19 format will continue to be supported but cannot make use of quotas. Rev. 19 disks do not need to have any quotas set on them. The use of quotas is entirely up to the System Administrator.

Quotas are limits placed on directory size. The limits are in disk record units (2048 bytes per record). No directory with a quota is permitted to obtain records causing it to exceed its quota. This restriction is enforced on the directory and all of its subdirectories. If multiple quotas are in effect at various levels of the subtree, the most restrictive quota is enforced. A quota of zero means unlimited usage.

COMMANDS

Two new commands have been added to PRIMOS to specifically support quotas. These are:

<code>LIST_QUOTA</code>	Lists the quota information of a directory. Maximum records allowed, total records in use, and records in use at the directory level are reported.
<code>SET_QUOTA</code>	Sets the maximum quota on a directory or removes any quota restrictions on the directory.

SUBROUTINES

In PRIMOS, there are two new subroutines that fully support the new quota mechanism. Both of the functions performed by the new quota commands described above can be performed by user programs if the programs use the new subroutines. See the Subroutines Reference Guide for information on these new subroutines.

IMPACTS OF QUOTAS ON EXISTING PROGRAMS

Certain changes to Rev. 19 software may affect the operation of existing programs. The new disk quota mechanism introduces two new error codes that can be returned by PRIMOS. This section describes these error codes and suggests methods for handling them.

New Error Codes

This section documents those new error codes that may be returned by subroutines that existed at Rev. 18 as a result of the new quota system.

Programs that expect specific error codes from file system subroutines should be examined to see if they need to be adjusted to include these new error codes.

In the case of E\$MXQB, the new error code will be returned only if use of quotas is made by the system, disk partition, or directory to which the program is referring.

E\$MXQB — "Maximum quota exceeded"

This error can occur any place where an E\$DKFL ("Disk full") error can occur. Examples include PRWF\$\$, WTLIN\$, SRCH\$\$ (to create a new file), CREA\$\$\$. This error code will only be returned, however, if the Disk Quotas feature is being used on the disk partition that the subroutine call references.

If Disk Quotas are going to be used on a system, any programs that check for the E\$DKFL error code must be changed to check also for the E\$MXQB error code.

The E\$MXQB error has essentially the same meaning as E\$DKFL: "There is insufficient space to complete the request". However, whereas E\$DKFL refers to the entire disk partition, E\$MXQB refers to the maximum quota (number of disk records) allowed in the directory involved in the operation. In both cases, it is wise to allow users to exit to PRIMOS so they can delete files, and then to allow the users to enter "START" and retry the operation.

E\$NFQB — "No free quota blocks"

This error can occur during any attach operation. Therefore, it can be returned any time that SRSFX\$, TSRC\$\$, or ATCH\$\$ is called. E\$NFQB should be a rare occurrence since it means that there is insufficient space in internal PRIMOS tables to track quota information for directories.

Most programs will not need to be changed to expect this error code. It can be regarded as being in the same class as E\$FUIU, "All file units in use" — it does not mean that there is anything wrong with the disk partition itself, simply that there are currently insufficient resources to complete the operation.

Note that this error code can be returned whether or not Disk Quotas are being used on the system.

CHAPTER 6

FILE UTILITIES

INTRODUCTION

The FUTIL subsystem and LISTF command have been replaced with a new set of PRIMOS commands referred to as the File System Utility. Together with the new Command Processor extensions described in Chapter 4, these commands provide a more powerful and easier to use a set of file system functions.

FUTIL and LISTF remain in the system and are unchanged, but they do not support the new command environment features.

The new commands are intended to replace the FUTIL subsystem and LISTF command; however, they are not compatible with FUTIL and LISTF. Command and CPL files made before Rev. 19 should still work, with one exception:

The PROTECT command is changed.

Notice the spelling of PROTECT — it refers to one of the new file system utility commands. The old PROTEC command is still present, as are its abbreviations (PRO, PROT, and PROTE). However, some users may have added the last "T" to the command name. This worked because any alphabetic characters following the first six characters of the command name (PROTEC) were ignored. It will no longer work.

Any existing command or CPL files that refer to the old PROTEC command as "PROTECT" must either be changed to use "PROTEC", or, preferably, changed to correctly use the new "PROTECT" command.

COMMANDS

There are five new commands that constitute the file system utility:

COPY	Copies files, segment directories, directories, and access categories.
DELETE	Deletes files, segment directories, directories, and access categories.
LD	Lists the contents of a directory, grouping its contents according to object type -- files first, segment directories second, directories third, and access categories fourth.

PROTECT Protects files, segment directories, and directories that are not in ACL directories.

RWLOCK Sets the read/write lock for files or segment directories.

Numerous options, which modify their behavior according to the user's desires, exist for these commands.

Users who are used to the FUTIL subsystem may want a simple guide to using the new file system utility commands. This guide is based on the FUTIL subsystem commands. Below is a list of FUTIL commands with their file system utility equivalences. In some cases, exact matching of function is not possible or desirable, but the basic function is adequately performed.

FUTIL: CLEAN prefix [level]

New: DELETE from-ufd>@@>prefix@@ -WALK_FROM 1 -WALK_TO level -FILE -NO_VERIFY

FUTIL: COPY filnama [filnamb]

New: COPY from-ufd>filnama to-ufd>filnamb

The user will be queried if filnamb already exists or if filnama is a directory or access category. If filnama is a segment directory, the operation will be performed.

FUTIL: COPYDAM filnama [filnamb]

New: COPY from-ufd>filnama to-ufd>filnamb -DAM

The user will be queried if filnamb already exists or if filnama is a directory or access category. If filnama is a segment directory, the operation will be performed.

FUTIL: COPYSAM filnama [filnamb]

New: COPY from-ufd>filnama to-ufd>filnamb -SAM

The user will be queried if filnamb exists or if filnama is a directory or access category. If filnama is a segment directory, the operation will be performed.

FUTIL: DELETE filnam

New: DELETE from-ufd>filnam

The user will be queried if filnam is a directory or access category. If filnam is a segment directory, the operation will be performed.

FUTIL: PROTEC filnam [owner] [nonowner]

New: PROTECT from-ufd>filnam owner nonowner

Specify owner and nonowner as "NIL", "R", or "RWD" rather than 0, 1, or 7. The operation will be performed even if filnam is a segment directory.

FUTIL: SCAN filnam [level]

New: LD from-ufd>@@>filnam -WALK_FROM 1 -WALK_TO level

The header for each directory that is scanned will be displayed.

FUTIL: SRWLOC filnam [rwlock]

New: RWLOCK filnam rwlock

Specify rwlock as "SYS", "EXCL", "UPDT", or "NONE" rather than 0, 1, 2, or 3. The operation will be performed even if filnam is a segment directory.

FUTIL: TRECPY filnama [filnamb]

New: COPY from-ufd>filnama to-ufd>filnamb -DIR -SEGDIR -NO_QUERY
-RWLOCK

Nothing is done if filnama is a file. If filnamb already exists and is a directory, the operation will be successfully performed.

FUTIL: TREDEL filnam

New: DELETE filnam -DIR -SEGDIR -NO_QUERY

Nothing is done if filnam is a file.

FUTIL: TREPRO filnam [owner] [nonowner]

New: PROTECT from-ufd>filnam>@@>@@ [owner] [nonowner] -WALK_FROM 1
-WALK_TO 999 -BOTTOM_UP

This form does not work if filnam is a segment directory; see the form used to replace the PROTEC command, above, for the correct use of PROTECT on segment directories.

FUTIL: TRESRW filnam [rwlock]

New: RWLOCK from-ufd>filnam>@@>@@ [rwlock] -WALK_FROM 1 -WALK_TO 999

This form does not work if filnam is a segment directory; see the form used to replace the SRWLOC command, above, for the correct use of RWLOCK on segment directories.

FUTIL: UFDCPY

New: COPY from-ufd>@@ to-ufd>== -RWLOCK -NO_QUERY -FILE -SEGDIR -DIR

This will work even if from-ufd and to-ufd are segment directories.

FUTIL: UFDDDEL

New: DELETE from-ufd>@@ -NO_QUERY -NO_VERIFY -FILE -SEGDIR -DIR

This will work even if from-ufd is a segment directory.

FUTIL: UFDPRO [owner] [nonowner] [level]

New: PROTECT from-ufd>@@>@@ [owner] [nonowner] -WALK_FROM 1
-WALK_TO 999

FUTIL: UFDSRW [rwlock] [level]

New: RWLOCK from-ufd>@@>@@ [rwlock] -WALK_FROM 1 -WALK_TO 999

The comments on the new command forms reflect differences between the old FUTIL utility and the behaviour of the new file system utility commands when the specified forms are used.

There are philosophical differences between the way FUTIL viewed the file system and the way the new file system utility commands view the file system. The major difference is that, with FUTIL, files are very different from segment directories and file directories (UFDs).

Therefore, separate commands exist to manipulate files versus directories. Performing a file command on a directory results in an error, as does performing a directory command on a file. Additionally, some capabilities FUTIL has when performing operations on file directories are not available when operating on segment directories.

However, the new file system utility commands view files, segment directories, file directories, and the new access categories as "file system objects". Therefore, a single command is operable on all such objects. When a differentiation is made between objects, files fall together with segment directories, and file directories fall together with access categories. This is unlike FUTIL, which grouped segment and file directories together.

An example is an attempt to delete an object with the new DELETE command. If a simple "DELETE filnam" command is given, the user will not be queried if filnam specifies a file or a segment directory. The user will be queried if filnam specifies a directory or an access category.

Because of this basic incompatibility between the approach to FUTIL and the approach to the new file system utility commands, it is highly recommended that users not attempt to build a "FUTIL conversion program" that is compatible with FUTIL yet uses the new file system utility commands. Instead, users should decide what each use of FUTIL in existing CPL and command files is trying to accomplish, and translate each use into an appropriate sequence of new file system utility commands. The new commands are quite powerful and flexible, but they are unable to precisely emulate the behaviour of FUTIL.

Therefore, the above list should be viewed as an aid to understanding the use of the new commands from a FUTIL point of view.

CHAPTER 7

FTS — FILE TRANSFER SERVICE

INTRODUCTION

The File Transfer Service (FTS) is a separately-priced software product for transferring files among Prime computers over a communications network. It functions over any PRIMENET link, including RINGNET, full-duplex, and half-duplex, and also over a public data network (PDN) link, such as TELENET or DATAPAC.

This chapter provides an overview of FTS. For additional information, see the PRIMENET Guide, the Prime User's Guide, the System Operator's Guide, and the System Administrator's Guide.

FTS COMPARED WITH THE FAM

Both the File Access Manager (FAM) and FTS provide network file transfer. One or the other will be more appropriate for any specific application because they differ in several ways:

- The FAM provides immediate, direct access to a remote file system for all permitted file system actions. FTS provides only queued file transfer, which is not necessarily immediate.
- The FAM ties up your terminal throughout an entire file transfer. FTS leaves it free.
- The FAM requires the remote site to be up and the communications link to be working at the time you request a remote file transfer. FTS accepts requests for file transfers at any time, regardless of the state of the remote site or the communications link. FTS queues the requests, and transfers files at a time when the remote site and the communications are functioning.
- If the communications link (or either computer site) fails during a FAM transfer, you must try again later, manually. FTS retries automatically and performs the transfer when communications have been restored.
- Use of the FAM is transparent to commands and programs that use the PRIMOS file system. Use of FTS must be explicitly requested by the user or the program. Generally, using the FAM is appropriate for closely related systems and using FTS is appropriate for transferring files over long haul networks.

COMMANDS

Three new commands provide the complete interface to the FTS system:

- FTR File Transfer Request. This command performs the submission, modification, and cancellation of requests for file transfer. It also allows users to interrogate the system as to the status of their file transfers.
- FTOP File Transfer Operator interface. This command starts and stops the FTS manager and server processes. It allows the operator to abort transfers that are currently taking place, and it allows interrogation as to the status of the FTS servers.
- FTGEN File Transfer Generation. This provides the System Administrator's interface to FTS, allowing the System Administrator to define FTS queues, servers, and remote sites. It also allows the System Administrator to display the current configuration and to initialize the configuration.

CHAPTER 8

USER REGISTRATION AND PROFILES

INTRODUCTION

The new Access Control Lists (ACLs) capability requires enhanced system security because ACLs depend on user identities, rather than passwords, for granting access privileges. Therefore, the ACL system must be guaranteed that these identities uniquely identify users or groups of users. Maintaining the identity of users is the main function of the new User Registration mechanism.

User Registration provides a secure login mechanism and login-time assignment of administrator-specified attributes for each user on the system. These attributes make up a User Profile.

In any installation, each user has both individual and group identities. While the definition and use of individual identities is essentially the same from installation to installation, group identities may vary.

For instance, one installation might be homogenous enough to have only one user group. Another installation might have several groups, but with each user in only one group. A third installation might have many groups, with each user in one or more of these groups. The User Registration and Profiles system addresses the entire range of those installations. The system is designed to allow its services to be tailored according to the needs of various kinds of installations.

There are two major aspects of the new User Registration and Profiles system: User Registration and Administrative Control. User Registration provides for secure and easy log in to the system, whereas Administrative Control provides for consistent usage and control of directories and files.

Note

The User Registration and Profiles data base must be created before any users can log in to the system.

User Identity

The identity of a user on a system is specified by a user id or user name. This name is up to 32 characters. Before Rev. 19, it was limited to 6 characters. A user id bears no direct relationship to the directory (UFD) to which that the user is logged in. Before Rev. 19, the user name identified the initial login directory for the user. In fact, the legality of the user name was defined purely by whether that user name existed as a directory on the system and whether the correct owner password had been specified. Now the mechanism for validating the ability of a user to log in is entirely separate from the existence of directories or their passwords.

A user may have a login password. It may be up to 16 characters. When users log in, they specify their passwords once, to gain access to the system. They do not need to specify the passwords again until the next time they log in, or until they decide to change their login passwords. Before Rev. 19, the "login" password would have to be specified each time users referenced their login UFDs.

Along with the user id and password, the system knows the initial attach point of the user. This is also known as the origin directory. When the user is logged in, the user is attached to that directory automatically. Unlike earlier revisions of PRIMOS, the directory name does not need to match the login name of the user in any way. In addition, it does not need to be a top-level UFD — it may be two or more levels below the MFD, if appropriate. As with earlier revisions of PRIMOS, however, the initial attach point must reside on a partition local to the system to which that the user is logging in.

Finally, a user can belong to up to 16 ACL Groups, as set up for that user by the System Administrator. In fact, a user can belong to many more if a member of several projects. Belonging to ACL groups may allow the user access to directories and files that the user would otherwise have no access to. By using ACL groups, a System or Project Administrator can protect a group of files and directories so that only users belonging to a certain ACL group can access them. Then, when another user needs to be granted access, that user can simply be added to the ACL group. No change needs to be made to the access on the files to accomplish this.

Projects

A Project is a group of users who have similar attributes and system usage. All users must belong to at least one project. The System Administrator may set up a default project; this can be the only project on a system. Users may belong to more than one project. Such users specify which project they are working on at login time. They may receive different attach points and ACL groups depending on the project to which they log in.

System Administrator

The System Administrator is a person who is responsible for controlling access to the system, distributing system resources, and generally monitoring the system. By definition, the System Administrator is the most trusted person in the system. The System Administrator also has the option of delegating responsibility to other users.

Project Administrator

A Project Administrator is a user who is responsible for maintaining activity within a particular project. The Project Administrator need not be a member of the project. A Project Administrator's responsibilities are delegated by the System Administrator. The System Administrator can limit the Project Administrator by setting limits on the project being administered. For example, the project may only be allowed to use a certain set of ACL group names.

Initial Processing

Each user may supply a login initialization processing file that is automatically invoked by Primos when the user logs in. It can be a CPL, command input, or resumeable file. After the user has been validated, logged in, and the external login program (if any) has been run, the system will execute the file. The file can be used to set up user attributes, such as erase and kill keys, abbreviation and global variables files, etc.

Support of Non-ACL Systems

For compatibility purposes, minimal support of User Registration and Profiles is provided at Rev. 19 for non-ACL systems. Such systems can only have one project, and the Project Administrator for that project must be the same person as the System Administrator. Additionally, no passwords are allowed on the directory containing the User Registration and Profiles information.

COMMANDS

The LOGIN command has been changed to support User Registration. A new option has been added to allow the user to specify the project to which the user wants to log in. If the option is not specified, and the user has a choice of projects, the system will ask for the project id.

There are several new commands that specifically support and constitute User Registration and Profiles:

LIST_GROUP	Lists the ACL groups to which the user belongs.
ORIGIN	Attaches the user back to the initial attach point.
CHANGE_PASSWORD	Allows users to change their login passwords.
ADD_REMOTE_ID	Specifies users' identities on remote systems that they intend to access during the session.
LIST_REMOTE_ID	Lists all of the users' identities that they have set up for accessing remote systems.
EDIT_PROFILE	Used by the System and Project Administrators to make changes to the User Registration and Profiles data base. It allows the addition, change, and deletion of user ids. When used by the System Administrator, the addition, change, and deletion of projects is possible.

In addition to these new commands, a utility named `CONVERT_PROFILE` is supplied. This utility enables the System Administrator to convert from a Rev. 18 system to a Rev. 19 system relatively easily.

SUBROUTINES

A new subroutine has been added to PRIMOS to support the User Registration and Profiles system. It is intended for use by external login programs that wish to obtain the user's project name. It is not documented in the Subroutines Reference Guide. Its calling sequence is as follows:

```
dcl prjid$ entry(char(32) var);  
call prjid$(project_id_name);
```

It returns the user's login project name in `project_id_name`. If the user is logged into the default project, the returned name will be "DEFAULT", since this is the name for the default project.

Note that trailing blanks on the project name will not be returned.

CHAPTER 9

NEW DISK FORMAT

INTRODUCTION

A new disk format has been defined for Rev. 19 systems. It supports the new Access Control Lists and Disk Quotas mechanisms. However, the old FIXRAT program cannot be run on a Rev. 19-format disk. Therefore, a new program exists, named FIX_DISK, that performs all of the functions of the obsolete FIXRAT.

In addition to supporting ACLs and Quotas, the Rev. 19 disk format supports a new method of handling badspots on the disk. The old method was improved because it forced the invalidation of an entire disk track, which involved nine records, rather than the invalidation of one record. This resulted in an inconsistency, since the file system could use the eight good records in a bad track, but the physical backup utilities (COPY_DISK and PHYSAV) would not back up those eight records because the track was marked as a bad track.

The old method also had no ability to remap the information intended for a bad record to a new record during a physical restore (COPY_DISK or PHYRST). This would cause the information to be lost.

The new method of handling badspots solves both problems. It is able to mark individual records, rather than entire tracks, as invalid. Additionally, it allows remapping of bad records so that information that is targeted for those records can be written elsewhere.

Rev. 19-format disks are identified by a "Revision stamp" so that Rev. 19 software can tell the difference between Rev. 19-format disks and pre-Rev. 19-format disks. No Rev. 19 software will work on "old partitions". These are partitions that were made either before Rev. 12 or between Revs. 12 and 17, using the "-OLD" option to MAKE. They are characterized by an inability to handle filenames greater than six characters in length, and support for them was dropped at Rev. 18.

COMMANDS

The following commands and subsystems have been visibly changed to accomodate the new Rev. 19-disk format:

PRIMOS II	A new version of PRIMOS II is required to use Rev. 19 formatted disks. It recognizes ACL directories as file directories. However, it has no support for ACLs or Disk Quotas, and it ignores ACL and Quota information on the disk. If the disk is changed while in PRIMOS II, FIX_DISK should be run to correct any incorrect quota information.
COPY_DISK	This command supports the new badspot mechanism and implements the remapping of badspots on the target disk. The user can request that the new badspot handling not be performed if FIX_DISK is not available to clean up afterwards.
FIXRAT	This command has been modified to not run on Rev. 19-format disks.
FIX_DISK	This is a new program that replaces FIXRAT. It understands Rev. 19 ACLs, Quotas, and badspot handling and cannot be run under PRIMOS II.
MAGSAV/MAGRST	This allows the user to suppress the saving of ACLs, access categories, and references to access categories. When run under PRIMOS II, no ACL or Quota information is saved or restored. As with the new disk format, Rev. 19 tapes are so identified by MAGSAV/MAGRST, and pre-Rev. 19 tapes are handled correctly. The user can ask MAGSAV to make pre-Rev. 19 tapes.
MAKE	This supports the new badspot handling mechanism. The user may request that MAKE build the badspot file automatically without asking the user for badspot addresses. MAKE now also initializes the paging portion of a partition (for split disks), so that a useful badspot file is generated for the PRIMOS preloader. The user may request MAKE to generate an old style badspot file for use on Rev. 18 or earlier PRIMOS.
PHYSAV/PHYRST	This supports the new badspot handling mechanism. The user may request that badspot handling not be performed, if FIX_DISK is not available to clean up afterwards.

PART III

Enhancements and Changes

CHAPTER 10

LANGUAGES

DBG (SOURCE LEVEL DEBUGGER) — Enhancements

Default Source File Name: It is now possible to change the default source file name of a program block (POLER #26947).

Value Tracing Performance: The performance of value tracing has been improved by a factor of 2 to 3, depending upon the size of the program.

VFINLIB — Enhancements

Logical Record Size Change: The logical record size for FORTRAN I/O is 134 bytes in R-mode. However, the logical record size in V-mode is 120 bytes (POLERS #48026, 27288, 47122).

CHAPTER 11

PRIMOS AND UTILITIES

PRIMOS — Enhancements

One-step Boot: PRIMOS may be cold started using a boot procedure that takes only one step — entering the "BOOT nnnnn" command. This was accomplished by using new values for nnnnn and adding the "PRIMOS" command to CMDNC0, which boots the system.

Wasted Paging Space Reduction: Previously, space on the main and alternate paging disks was allocated in segment-sized blocks, except for certain internal segments. Since many segments are not fully utilized, space is now being allocated in smaller chunks. In particular, instead of allocating 128 kb, space is now allocated in 16 kb chunks. This can result in an increase in the maximum number of segments that a system can handle.

New Subroutines: To see a description of new (and changed) subroutines in PRIMOS, see the section called SUBROUTINES — Enhancements, later in this chapter.

STATUS USERS: The STATUS USERS command now handles the new 32-character user-name length. It also distinguishes between phantoms, slaves, and the new network server process.

Error Handling During Login: Enhancements to the mechanism for handling errors during the login process now guarantee that users will not be logged in until they have fully completed the validation process, even if a fatal or severe error, such as Access Violation or Illegal Segment Number, occurs during the validation process.

Event Logging: PRIMOS now allows event logging to be turned on or off while the system is running. This is accomplished by the new EVENT_LOG command, which can only be used from the system console.

Event log files have been moved out of CMDNC0. They were called LOGREC (for system events) and NETREC (for network events). Now, system events are recorded in log files in the top-level UFD LOGREC*, and network events are recorded in log files in the top-level UFD PRIMENET*. More than one file is used in each case to make searching for events on specific days easier and to allow cleaning up of the log files while the system is running. The file name of a log file contains the date when logging for the event class (system or network) was turned on.

Phantom Logout Notification: PRIMOS now notifies the user when a phantom that the user spawned logs out. PRIMOS will print the user number of the phantom, the date and time of logout, and the phantom's elapsed, CPU, and I/O times. It also tells the user whether the phantom logged out normally or abnormally. User programs may extract this information, if desired. See the description of the new LON\$R subroutine in the section called SUBROUTINES — Enhancements, later in this chapter.

New Condition Names Signalled: PRIMOS now signals two new conditions, LOGOUT\$ and PH_LOGO\$. LOGOUT\$ is signalled when the process is force-logged out, either because the terminal was disconnected, another user did an explicit force-logout, or the process was inactive for a sufficient amount of time. The process has a minimum of 1 elapsed minute to perform any wrap-up activities before the logout takes effect.

PH_LOGO\$ is signalled when a phantom that the process started up logs out. A program can use this signal to know when to check for phantom logout. (See the new LON\$R subroutine described in SUBROUTINES — Enhancements.)

DATE While Logged Out: The DATE command may now be used by a logged-out user.

AVAIL -- Enhancements

Record Size: AVAIL now reports free disk records and disk size in physical records, which are 2048 bytes long. Previously, it reported in normalized records, which are 880 bytes long. If it is necessary to get Rev. 19.0 AVAIL to report in the old 880-byte record size, use the "-NORM" option on the AVAIL command line.

BATCH — Enhancements

Batch Monitor Login Name: The Batch monitor now logs in as user "BATCH_SERVICE" rather than system. This helps distinguish the Batch monitor from other system phantoms such as the printer spoolers. It also allows greater ease in determining the source of messages sent to the system console by Batch.

ACL Support: Batch takes advantage of the new ACL mechanism to achieve greater security and flexibility. The added flexibility involves allowing a System Administrator to perform many privileged functions without having to be logged in as "SYSTEM". The added security prevents one user from causing a Batch job to be run with another user's user name. In fact, unlike previous revisions of Batch, users are prevented from modifying the queue control files that contain information on their Batch jobs without using the JOB command. Preventing such modification is more important now, as the advent of ACLs and User Registration means that a user name, rather than knowledge of a password, can be a key to accessing sensitive information.

New INIT Program: The INIT program, which is used by the System Administrator to initialize Batch, has been rewritten. It now performs all of the functions previously performed by the command files C_BDIF and C_RSET in the BATCHQ UFD.

Settable Batch Administrator: Using the INIT program, System Administrators set themselves up as Batch administrators. However, System Administrators can also set other users on the system up as Batch administrators via INIT.

More Batch Queues: Batch now supports up to 16 queues. Previously, the limit was 6.

Improved Startup Sequence: The old Batch startup sequence required operator intervention at a point following completion of cold start. Now, the Batch monitor is started with one command, BATCH -START, rather than three commands. This new startup sequence can be entirely performed by the C_PRMO file and thus requires no operator intervention.

Improved Data Base Error Logging: The data base error logging mechanism has been improved to produce a more readable file. Additionally, it now appends entries to the file rather than overwriting previous ones.

32-Character User-name Support: Batch supports the new 32-character user name in PRIMOS. Aside from internal changes, this support basically entails changes to the output formats of the JOB -STATUS and BATCH -DISPLAY commands.

Faster Turnaround: The Batch monitor is now semaphore-driven, meaning that it recognizes a job submission much faster when the monitor is idle. This can result in nearly immediate initiation of the job following submission. Previously, the monitor simply slept for 15 seconds at a time.

Abbreviations: Abbreviations are now defined for most of the often-used options for the BATCH and JOB commands. Additionally, many of the BATGEN commands and subcommands now have abbreviations. The option abbreviations are shown in the "Usage" messages via uppercase and lowercase.

BATGEN Errors: When BATGEN reports an error while in command or subcommand mode, it will now cause command files to abort by indicating a subsystem error to PRIMOS. Interactive users will notice no difference.

Initial Queue Parameter Values: The initial values for the CPTIME and ETIME parameters have been changed to "None", meaning "no limit". This affects the creation of new queues using BATGEN.

User Registration Support: Group names and the project name are correctly assigned to an initiated Batch job by the Batch monitor.

JOB -DISPLAY: Because of the advent of ACLs, the JOB -DISPLAY command now displays the home UFD of the Batch job.

New BATCH Program: The BATCH program has been rewritten. A new -STATUS option complements the existing -DISPLAY option; it produces a short summary of the state of the Batch subsystem. System operators no longer have to specify the word "SYSTEM" between the command "BATCH" and the desired (privileged) option.

Force-logouts Handled: The Batch subsystem is generally impervious to force logout, greatly reducing the chance that the job data base be corrupted. The Batch monitor actually handles the occurrence of a force logout gracefully, by shutting itself down and sending a message to the system console. Therefore, the "BATCH SYSTEM -STOP" command (now "BATCH -STOP") is no longer required when shutting the system down.

Monitor Log File: Some format changes have occurred to the Batch monitor's log file (O_LOG in BATCHQ). These changes make the logfile easier to read. Additionally, due to the new phantom logout notification system in PRIMOS, messages are written to the log file whenever a phantom spawned by the monitor (i.e., a Batch job) logs out.

Quota Exceeded Error: The Batch subsystem handles the new "Maximum Quota Exceeded" error in the same way that it handles the "Disk full" error. If the error is encountered during job submission, the job is not submitted. If the error is encountered by the Batch monitor during job initiation, the monitor sends a message to the console and waits 5 to 10 minutes before attempting to start the job again.

COPY_DISK — Enhancements

New Badspot Support: See Chapter 9 for a description of the new badspot handling in COPY_DISK.

Performance Improvement: A performance improvement of approximately 250% can be realized for all processors below (but not including) a PRIME 750. This is done by specifying the new -LOWEND option on the COPY_DISK command line. However, specifying this option on a PRIME 750 or higher will increase the copy time.

Messages Removed: A disk copy is not complete until after the verification phase. Therefore, the messages that were output by COPY_DISK and that kept the user abreast of which phase the disk copy was in have been removed. This should reduce the temptation of users who think that all copying is completed to abort (via control-P) the verification phase.

Default Option: The -NOVERIFY option is now the default for COPY_DISK. If verification is desired, it must be specified via the -DO_VERIFY option.

LOGPRT — Enhancements

New Log File Locations: System and network event log files are no longer located in the CMDNC0 UFD with the names "LOGREC" and "NETREC". They are now located in the LOGREC* and PRIMENET* top-level directories. Additionally, separate files are created for each separate day that logging is turned on. LOGPRT has been modified to default to using these directories if an input treename is not specified. The most recently created log file found in the LOGREC* or PRIMENET* directory is used if the log file name is not specified by the user.

New Event Types: Three new system event types and five new network event types are now handled by LOGPRT.

MAGSAV/MAGRST — Enhancements

-TTY Option: The new -TTY option forces the following questions to wait for responses from the terminal (rather than from the current input stream, which may be a command file):

- MAGSAV's "Do you want to rewind tape?" (asked if the second or subsequent physical reel(s) of a save are not at load point)
- MAGRST's "Do you want to rewind tape?" (asked if the second or subsequent physical reel(s) of a restore are not at load point)
- MAGRST's "Continue with this reel?" (asked if the user mounts a continuation reel whose reel number is not in sequence)

New Option for Incremental Saves: A new command line option, -SAVE_UFD (abbreviated -SUF), is now available for MAGSAV. If -SUF is specified on an incremental save, an entry is saved for each UFD, regardless of whether any files in the UFD have been changed since the previous save. The -SUF option thus preserves tree structure so that the incremental save can be restored into an empty UFD without first restoring the original save.

If a UFD is saved on an incremental save, but none of the UFD's files were changed since the previous save, an empty UFD will be created on restore.

The -SUF option can only be specified on incremental saves, that is, when -INC is also specified (POLER #41766).

Error Handling: Tape error handling in MAGSAV has been changed. Versions 2 and 3 of the tape controller (Integrated Formatter and GCR Formatter) now use the ERASE command to recover from tape write errors. Versions 0 and 1 (Kennedy Formatters) continue to use file marks for recovery (POLER #45426).

Error recovery on labels has been improved. Error recovery will now be applied for every label instead of only for labels on the first logical tape. The number of retries during label writing has been increased from 5 to 20. If a label is successfully written after recovery has taken place, the number of retries is printed. If the label cannot be written, the reason for failure is printed. New error messages for label recovery are as follows:

- UNABLE TO WRITE FILE MARK
- UNABLE TO BACKSPACE
- UNABLE TO FIND FILE MARK

- UNABLE TO ERASE TAPE
- RECOVERY RETRIES EXCEEDED

ACL Support: See Chapter 3 for a description of the new ACL support in MAGSAV and MAGRST.

Block Size: The default block size is now 4096 bytes, using variable size blocks. Therefore, the -VAR option need no longer be specified. To write 1024-byte fixed records, use the new option -P300. To write 2048-byte fixed blocks, use the old -LONG option. Note that the -P300 option also suppresses the saving of ACLs and references to access categories.

Option Removed: The -OLD option, which requested that MAGSAV make tapes compatible with PRIMOS revisions before Rev. 12, has been removed. MAGSAV can no longer make such tapes.

Command Removed: The \$VALID command has been removed.

Option Abbreviation: Command line options in MAGRST and MAGSAV may not be abbreviated to their truncated forms. For some options, there are now specific abbreviations that are to be used instead.

PHYSAV/PHYRST — Enhancements

New Badspot Support: See Chapter 9 for a description of the new badspot handling in PHYSAV and PHYRST.

Performance Improvement: A performance improvement of approximately 250% can be realized for all processors below (but not including) a PRIME 750. This is done by specifying the new -LOWEND option on the PHYSAV command line. However, specifying this option on a PRIME 750 or higher will increase the copy time.

SEG — Enhancements

SPL Library: SEG now automatically loads the SPL library, SPLLIB, whenever the Pure Fortran library, PFTNLB, is loaded via the LIB or PL subcommands. However, this means that Rev. 19.0 SEG cannot be run on any system that does not have the SPL library.

SIZE — Enhancements

ACL Support: See Chapter 3 for a description of ACL support in the SIZE command.

Functionality Replaced: The primary function of the SIZE command has been replaced by the new LD command. See Chapter 3 for a description of the new LD command.

Entries in Objects: When SIZE is used to print the size of a file object that is not a SAM or DAM file, SIZE now prints the size of the object in terms of the number of entries in the object. This number includes the number of top-level entries of any type in the specified segment directory or file directory, or the number of entries in the access category. The printing of the size in entries is distinguished from the size in records by using the word "entry" or "entries" in the output instead of "record" or "records".

Record Size: SIZE now reports file sizes in physical records, which are 2048 bytes long. Previously, it reported in normalized records, which are 880 bytes long. If it is necessary to get Rev. 19.0 SIZE to report in the old 880-byte record size, use the "-NORM" option on the SIZE command line.

Treename Displayed: The treename that was specified on the SIZE command line is now displayed in the output. This is done so that use of SIZE, along with the new command line features such as wildcards, will produce usable output. See Chapter 4 for a brief description of wildcards.

Lowercase Output: For purposes of readability, SIZE now uses lowercase for its output. However, the specified treename is output as supplied by the user; thus the treename is often in uppercase. Also, the words "UFD" and "SEGDIR" are output in uppercase so that file and segment directory entries can be readily recognized in a large output.

Object Type Reported: The type of the file system object specified by the treename is now output by the SIZE program on its line of output. Files, directories, segment directories, and access categories are identified in this way. Additionally, SAM files versus DAM files and segment directories are also differentiated in this way.

Additional Object Size Information: At the end of the output line, SIZE will report the size of the specified object in a different perspective from that at the beginning of the line. This is not true of access categories. Files will have their sizes reported in words in addition to records. Segment directories will have the total number of entries reserved in the directory reported, in addition to the number actually in use. File directories will have the number of words in the directory itself reported, in addition to the number of entries.

SPOOL — Enhancements

SPOOL\$ Subroutine: See the section called SUBROUTINES — Enhancements, later in this chapter, for information on the SPOOL\$ subroutine.

32-Character User Name Support: The Spool subsystem supports the new 32-character user name in PRIMOS. Aside from internal changes, this primarily affects the output of the SPOOL -LIST command and the header pages on output listings.

EVFU Support: The Spool subsystem has additional support for the Electronic Vertical Format Unit (EVFU). This software capability replaces the paper tape loop or forms length selector on printers that have EVFU units. The System Administrator can use this feature to assign channel numbers to specific lines on a form, and users can use these channel numbers in their spool files to cause the printer to advance the form to the correct place.

Record Size: SPOOL now reports spooled file sizes in physical records, which are 2048 bytes long. Previously, it reported in normalized records, which are 880 bytes long. This will result in different file sizes reported by the SPOOL command.

Pathname Support: The SPOOL command now notes the full pathname of the spooled file, so that this pathname can be put on the header page when the file is printed. This feature is added so that users may easily determine precisely where they found the file whose listing they have.

-AS Effect Changes: Due to the new pathname support, the -AS option has a slightly different effect. It only changes the name of the file seen in a SPOOL -LIST and in the large banner letters on the header page. It will not change the filename seen on the third line of the header page unless the listing was spooled with the -OPEN option, since the full pathname of the file, including its real name, will be on the third line.

Date/Time Modified Information: In addition to determining the full pathname of the spooled file, SPOOL will also determine the date and time the file was last modified, so that this information can also be printed on the header page. As with the full pathname feature, this feature is provided for the user's convenience.

Header Page in Lowercase: The header page is now output in uppercase and lowercase for increased readability. However, a printer whose PROP environment specifies that it cannot handle lowercase will be sent a converted version of the header page.

Additional Information on Trailer Page: The trailer page now contains more information to assist in the bursting of listings. This new information includes the user name of the submitter, the destination name, the request id number, the form type, and the pathname or filename of the file.

PROP Numeric Parameters: In PROP environment definition mode, entered via the -MODIFY and -CREATE options, all numeric parameters are now checked against acceptable limits. If they do not fall into the correct range, an error message informing the user of the correct range will be printed. Additionally, the keyword "off" can often be submitted for appropriate numeric parameters.

Printing File Indicator: In the output from a SPOOL -LIST command, a file that is being printed will be indicated by an asterisk (*) between the spool file id (PRT number) and the submission time. If any files displayed are being printed, the reminder message "* means file being printed" is displayed at the bottom of the list.

SUBROUTINES -- Enhancements

Missing Subroutine: One subroutine, LON\$CN, which is documented in the Subroutines Reference Guide, does not exist and therefore cannot be called. The function given for LON\$CN is to enable or disable the signalling of the "PH_LOGO\$" condition. Any attempt to use this subroutine will fail.

SPOOL\$: The spool submission subroutine, SPOOL\$, has become a shared library at Rev. 19.0. This subroutine resides in LIB>SPOOL\$.BIN for R-mode programs and LIB>VSPOOL\$.BIN for V-mode programs. The actual subroutine that is loaded with programs is now simply an interlude to the shared copy of SPOOL\$ via the PRIMOS dynamic linking mechanism. In R-mode, this involves entering V-mode and making the call. In V-mode, the library simply contains a dynamic link to SPOOL\$. Because of this change, programs that use SPOOL\$ will become slightly smaller when they are rebuilt at Rev. 19.0. Any existing program that uses SPOOL\$ should be rebuilt at Rev. 19.0, although rebuilding the program is not necessary for the program to continue to function.

ASNLN\$: The new PRIMOS subroutine, ASNLN\$, now exists. This subroutine allows user programs to request the assignment of an AMLC line.

PHNIM\$: The new PRIMOS subroutine, PHNIM\$, now exists. This subroutine allows a program to start up a phantom using either a command input or CPL file.

FORCEW: The PRIMOS subroutine FORCEW now has an additional argument that allows the program to obtain the status of disk write operations for the file unit specified in the call. This new argument is optional. Existing programs need not be changed to use it.

LON\$R: The new PRIMOS subroutine, LON\$R, now exists. It allows a user program to interrogate PRIMOS as to whether any phantoms spawned by the calling process have logged out and to obtain information as to the circumstances of the logout. When the phantom logs out, the new condition PH_LOGO\$ is signalled. Programs should intercept this condition and use LON\$R to obtain the information. Information on the elapsed, CPU, and I/O times used by the phantom, in addition to the phantom's user number and information on whether the phantom logged out normally or abnormally, is supplied by this subroutine.

CHAPTER 12

DATA MANAGEMENT SYSTEMS

DBMS — Enhancements

ACL Issues: See Chapter 3 for information on the issues involved with ACLs and DBMS.

32-Character User-name Support: All of DBMS supports the new 32-character user name in PRIMOS. Aside from internal changes, this affects the trace and listings files, DBA verification, and display of the user name to the terminal.

CDML/FDML

Preprocessor Command Lines: The preprocessors are now invoked by a new command line, and they adhere to the suffix conventions in PRIMOS.

Syntax Errors: The error messages output as a result of syntax errors are now more helpful to the programmer. They display the incorrect entry, and they also list the valid options.

SUPPRESS Statement Has New Keyword: The SUPPRESS statement now accepts the optional keyword "THEN", so that it will be more readable; for example, "CLEAR THEN SUPPRESS ALL".

MODIFY Keyword Removed: The "IN" keyword for the MODIFY statement has been removed.

ON ERROR Can PERFORM: The ON ERROR statement now allows the PERFORM keyword, in addition to the GO TO keyword, to be used to perform a procedure that has no parameters. The PERFORM keyword translates into a CALL in FORTRAN.

Separators: Commas, semicolons, and spaces are now all treated as separators and may be used freely within a DBMS statement. DBMS statements are terminated by a fullstop (.) or by end of line (unless the next line contains a DBMS statement or a continuation of a DBMS statement).

DBMS in COBOL IF: A DBMS statement that is not an IF statement does not have an ON ERROR clause, and is not terminated by a fullstop may be used anywhere within a COBOL IF statement. If it does not meet these requirements, it can only appear as the last statement in the COBOL IF statement.

ILIB

Free Space Pointers: The free space pointers within areas now reside in shared memory. Their access is controlled by a single-threaded queue. A small recovery mechanism was implemented in DMLCP to ensure the integrity of these pointers (POLER #34491).

CSUBS

Consistency Checks: More consistency checks of schemas and subschemas are now made, and there is a change in the format of the error messages (POLER #824571).

DMLCP

Automatic CLUP: The DBMS runtime facility is now capable of performing an automatic clean-up of incomplete transactions and open files when most errors occur. When this happens, the user is notified at the terminal of the success of the cleanup and is told what signal caused the cleanup to happen. This information is also written to the FIRACE file. However, not all errors can be automatically recovered from in this manner, so the CLUP program is still present for user invocation.

Dynamic Pack: AREA files are now dynamically packed. Users no longer need to pack AREA files with DBACP. However, CALC files are not dynamically packed.

MIDAS -- Enhancements

Obsolete Utilities: The REMAKE and REVERT utilities are no longer present on the Master Disk. They were used to convert files from Rev. 15 to Rev. 16 format. All users should have made this conversion on all their files by the time they install Rev. 19 MIDAS.

MIDAS Parameters: In the MIDAS User's Guide, the bottom of page 15-8 describes the procedure to modify MIDAS parameters under "MODIFYING MIDAS". The paragraph refers to the file KPARAM in the directory MIDAS. These names have been changed to KPARAM.INS.FIN, in the directory MIDASSRC>SOURCE. Also, if any parameters are modified, MIDAS must be rebuilt and reshared to cause them to take effect.

New Insert File Name: The insert files in MIDAS and MIDAS>SYSCOM now have suffixes. The old file names have been retained for compatibility. Users should use the new suffix form in future applications.

Utility Options: The utilities CREATK, IMIDAS, KBUILD, KIDDEL, and MPACK do not accept command line arguments or options. They have been modified to produce an error message if invoked with arguments or options on the command line.

PRIME/POWER — Enhancements

32-Character User-name Support: PRIME POWER now supports the new 32-character user name in PRIMOS. Aside from internal changes, this affects the USER LIST, the audit files, individual command priority filenames, and the LOG file.

Conversion Utility: A utility to convert a PKFILE made before Rev. 18.2 to a Rev. 18.2 format PKFILE is included with the Master Disk. It need only be run once to convert a PKFILE. This utility was not present on the Rev. 18.2 Master Disk.

Terminal Support: PRIME POWER now supports the PRIME PT65 terminal. Users must downline load a special program into their PT65, before entering POWER, to use the PT65 with POWER.

ACL Issues: See Chapter 3 for information on the issues involved with ACLs and PRIME POWER.

CHAPTER 13
COMMUNICATIONS

DPTX — Enhancements

Login Names: The process login names are now suffixed with "_DPTX"; for example, "BSCMAN_DPTX".

PRIMENET — Enhancements

New Network Server Process: The networks are now serviced by a new process, NETMAN, that runs as a phantom. User 1 no longer performs the network service functions.

RJE (REMOTE JOB ENTRY) PRODUCTS — EnhancementsGENERAL

Debug Facilities: Debug facilities have been improved.

Operator Control: The ability for a single operator to control more than one emulator at a time is now present.

Programmed Submission: Files can now be submitted from within a user program.

Improved Queueing Facilities: The queueing facilities have been improved.

File Transmission: There is now better control of file transmission.

1004, 7020, GRTS, 200UT

Destination Detection: Destination detection has been added.

SMLC Lines: Dynamic SMLC line assignment is now done.

Running the Emulator: For receive translation, it is no longer necessary to tie up a terminal to run the emulator.

X80, HASP

Eight Lines Supported: Eight lines are now supported.

High Modem Speeds Supported: Modem speeds of up to 56 kb are now supported.

Performance: CPU usage has been reduced.

Throughput: Higher line throughput has been achieved.

Destination Detection: Destination detection has been added.

Debug Facilities: Debug facilities have been improved.

SMLC Lines: Dynamic SMLC line assignment is now done.

Line Recovery: Line recovery has been improved.

Multi-streaming: Multi-streaming is now supported. (HASP only)

HOST Mode: Limited HOST mode is now supported. (HASP only)

XBM

New Emulator: The new emulator, XBM, has been added.

PART IV
Problems Fixed

CHAPTER 14

LANGUAGES

BASIC/VM — Problems Fixed

MARGIN Statement: Large margins were causing unpredictable program errors, including problems with assigning values to 0th array elements. The MARGIN statement has been modified to accept a range of 1 to 1000 instead of 1 to 32767 (POLERS #14445, 22252, 31240, 32468, 33524).

Assignment Statements: The compiler was accepting LET statements with constants on both sides of the equal sign (for example, LET 34 = 56). Such statements are no longer accepted (POLERS #24782, 33288).

Statements such as LET A = 5 and A = 5 are now interpreted as equivalent, as they should be (POLER #30491).

Writing to BINDA files: Records written to BINDA files sometimes contained portions of previously-written records because buffers were not being cleared. This problem has been corrected (POLER #25085).

Subscript Problems: Floating point array subscripts are now evaluated correctly (POLER #25478).

BASICV now accepts assignment statements with function array subscripts on the left hand side of the equal sign (POLER #22250).

Extraneous DIM statements: The compiler now flags multiple DIM statements for the same array (POLER #27202).

ELSE GOTO/ELSE GOSUB Statements: The compiler was interpreting ON GOSUB...ELSE GOTO as ON GOSUB...ELSE GOSUB. Both ON GOSUB...ELSE GOTO and ON GOSUB...ELSE GOSUB are now supported (POLER #28895). The latter pair has the form:

```
ON [num-expr] GOSUB [lin-num-1,...lin-num-n]
...ELSE GOSUB [lin-num]
```

Rounding Consistency: The INT function now rounds decimal numbers correctly (POLER #29528).

LIN Modifier: LIN(0) now produces a carriage return without a line feed, as it should (POLER #27884).

LIN modifiers in WRITE statements were causing all output to be sent to the terminal (rather than to a specified output file). The compiler no longer allows LIN modifiers in WRITE statements (POLER #14440).

RESEQUENCE Command: The RESEQUENCE command was changing some characters in program lines as it resequenced. This problem has been corrected (POLERS #31144, 36867, 37252).

MAT Statement Error: The illegal statement `MAT A = MAT B * MAT C` now elicits the error message "Illegal syntax in a MAT statement" rather than the message "Internal compiler error in cmplt" (POLER #32467).

Repeated Runs: The MARGIN counter, cursor position, and other printing parameters were not being reset between consecutive RUN commands. This problem has been corrected (POLERS #33525, 34918, 82480).

AND/OR/NOT Clauses: In certain IF statements with complex AND, OR, and NOT clauses, BASICV was misinterpreting parentheses. This problem has been corrected (POLERS #33529, 34394, 36052).

Exponential Function: BASICV now correctly handles large negative exponents (POLER #34237).

"IF NOT NOT..." Statements: Statements such as "IF NOT NOT A THEN GOTO 100" were causing program halts. The compiler no longer allows such statements (POLER #35335).

Scratch Files: ASCDA scratch files are now automatically deleted when closed, as they should be (POLER #81646). BASICV was sometimes deleting the program file(s) instead of the scratch file. This problem has been corrected (POLERS #44146, 80864).

RUN Command Problem: RUN commands with statement numbers did not work correctly in programs with more than one DIM statement. This problem has been corrected (POLER #82706).

DBG (SOURCE LEVEL DEBUGGER) — Problems Fixed

Array Evaluation: A problem that was causing occasional access violations during evaluation of arrays has been corrected.

Subscripted Labels: A warning message is now displayed on an attempt to evaluate subscripted labels as an array (POLER #32661).

Pascal: The ordinal value of a Pascal character with bit offset is now computed correctly (POLER #35849).

Strings: The string built-in functions (including INDEX) now work correctly.

HELP: The HELP command now works with the argument "BREAKPOINT-IDENTIFIER".

Parameters with Bit Offsets: Parameters with bit offsets are now evaluated correctly in ":" commands, "IF" commands, etc. (POLER #45236).

Breakpoint Table Overflow: A warning message is now printed if the breakpoint table overflows.

FORTRAN (FTN) — Problems Fixed

Relational Operators: An overflow problem that occurred when relational operators compared integers has been corrected (POLERS #35339, 82303, 82614, 25845).

Error Messages: The compiler now reports an error when an array name is used as a statement function dummy argument (POLER #82976).

Array Syntax: Statements with illegal syntax involving arrays compiled without error messages, producing incorrect program results. The errors are now detected (POLERS #81994, 40709).

Insert Files: Using \$INS instead of \$INSERT neither generated a compile-time error nor inserted a file into the program. This problem has been corrected (POLER #30130).

Indirect Errors: Indirect errors were sometimes occurring in the object code and being detected by SEG. This problem has been corrected (POLER #36980).

PASCAL -- Problems Fixed

Disk Organization: The files A\$KEYS.PASCAL, ERRD.PASCAL, and KEYS.PASCAL now reside in the SYSCOM UFD (POLER #35855).

WITH Statements: A WITH statement did not work properly for a record that spanned a segment. This problem has been corrected (POLER #29463).

BAD UNIT NUMBER Error: A BAD UNIT NUMBER error was generated at compile time if segment 4001 was not initialized to zero before compilation. This problem has been corrected (POLER #43164).

Real Numbers: When printing, PASCAL now rounds real numbers instead of truncating them (POLER #27635).

Real numbers with more than 15 digits are now written correctly (POLER #41961).

Read of a Record: A read of a record no longer causes a compiler error.

VFNLIB — Problems Fixed

F\$INQF: F\$INQF no longer closes any command input file that the user has open at the time of inquiry (POLER #11985).

F\$MIN: F\$MIN now gives correct results if the arguments are within legal bounds (POLERS #22050, 40357).

F\$IO77: F\$IO77 does correct outputs, with leading zeros only when necessary (POLER #27250).

F\$IO77 now accepts B-format statements with surrounding blanks (POLER #29621).

F\$IO77 now handles non word-aligned character output from internal formats correctly (POLERS #31488, 32927).

SQRT: SQRT now allows more accurate comparisons between returned results (POLER #28524).

DEXP: DEXP now returns 1.0 if its argument is 0.0 (POLER #29556).

F\$IOFIN: F\$IOFIN now operates properly on multiple, internal, sequential commas (POLER #30249).

F\$IOFIN now handles encodes of non word-aligned characters correctly (POLER #32166).

F\$IOFIN now accepts B-format statements, which may be surrounded with blanks.

NAMEQ\$: NAMEQ\$ now checks for lowercase a (POLER #31198).

CABS: CABS no longer overflows if the argument is within legal bounds (POLER #32724).

F\$CLOS: F\$CLOS can now delete a scratch file from a passworded UFD, provided that the program is executed by a user with owner status (POLER #40213).

P\$ATOA: P\$ATOA now traps numbers with multiple decimal points and delivers an error message.

P\$ATOA now correctly handles the rounding of floating point numbers.

VRPG -- Problems Fixed

Maximum Table and Array Size: The maximum allowable size of compile-time tables or arrays has been expanded from 80 character records to 256 character records (POLER #37191).

BLANK AFTER Works: The BLANK AFTER specification now works properly for tables, arrays, and array elements (POLER #45957).

Packed and Binary Fields: When a decimal position length was greater than the length of the field, a severity 3 error would occur. Now, this error only occurs when the decimal position length is greater than the unpacked decimal length of the field (POLER #45942).

Lookup Operation: For the lookup operation that used binary or packed data, the check made to test that the index field length was equal to the table or array length now correctly compares the unpacked decimal length of both factors.

CHAPTER 15

PRIMOS AND UTILITIES

PRIMOS — Problems Fixed

AMLTIM Config Directive: The default value for the second argument of the AMLTIM Config Directive is now correctly calculated (POLER #82632).

Cold Start: During cold start, if PRIMOS cannot attach to CMDNCO because of a "bad password" error, an error message will be printed (POLER #23089).

COMOUTPUT: Command output files may now be closed only by the "COMOUTPUT -END" command, not by the OPEN or CLOSE commands.

Phantoms: Phantoms will now clean up and log out if fatal errors occur during login (POLER #41622).

PRIMOS now produces an error message if a phantom tries to access a file to which the user has no access rights (POLER #41521).

SMLC: Unassigning an SMLC line will no longer cause the system to crash if another SMLC line, line 4 or greater, is using the same segment as the unassigned line (POLER #29196).

T\$CMPC: Reading cards in binary no longer takes twice as long as reading them in ASCII (POLER #27971).

The status code returned from T\$CMPC as a result of a read status instruction (key :100000) is unreliable, as it only specifies whether input is available in the PRIMOS input buffer. A new instruction to read hardware status (key :100001) that actually checks with the device itself, returning a reliable status indicator, has been added (POLER #27073).

T\$LMPC: The read status instruction was returning a status of ON-LINE regardless of the state of the line printer. This instruction now returns the hardware online status bit from the controller (POLER #33480).

Tape Drive Operation: The current limit for magtape reads and writes is six pages. PRIMOS now detects an error if the user attempts to transfer more than 64K bytes with a buffer in the low part of a segment.

Magnetic tape ASSIGN commands entered at the supervisor terminal and requesting operator action were hanging the terminal because it waited for a reply from itself. This problem has been corrected. However, the ASSIGN MTX -ALIAS MTn form of the ASSIGN command can no longer be entered at the supervisor terminal, because in this case a reply from the operator is required.

It is now possible to set the density to 6250 bpi from the front panel of the Model 3 controller/magnetic tape drive (POLERS #29261, 31851, 35688).

Treenames: The internal PRIMOS treename processing routine, TAS, now correctly handles the specification "<volume>filename" by attaching to the MFD, allowing the specified operation to reference "filename" in the correct place. This affects the "LISTING", "BINARY", and "OPEN" commands.

UNASSIGN: An error message for the magnetic tape UNASSIGN command that described proper usage of the ASSIGN command has been corrected (POLER #33448).

WTLIN\$: WTLIN\$ now recognizes a disk full condition and no longer writes over a previously-written portion of the file (POLER #45589).

300 lpm printer/plotter: When the 300 lpm printer/plotter is nearly done printing the last file in the spool queue, it no longer prints the remaining lines at a rate of one line per minute (POLERS #20655, 32622, 31068).

AVAIL — Problems Fixed

AVAIL *: The AVAIL * command now correctly handles a SYSTEM>DISCS file that has no comments field (POLER #45591).

BATCH — Problems Fixed

CPL Jobs: CPL jobs with arguments were not executing successfully if the BATCHQ>CIFILE directory had a non-blank password. This problem has been corrected (POLER #41773).

Error Messages: When a fatal error occurs, the error code number sent to the system console is now correct. (Previously, only the tens digit was sent.)

The "<text> seen where end-of-line expected" message is now correctly provided when necessary.

The error message "Command file required as first argument on submission" has been changed to "Command or CPL file required as first argument on submission."

BATGEN: The BLOCK, UNBLOCK, and DELETE ALL commands in BATGEN now correctly append a comma to the end of each line of queue names if there are more names left.

Data Base Locking Mechanism: Batch now uses a named semaphore, rather than a sleep loop, to assure prompt service while attaining its internal database lock.

File in Use Timeouts: The timeout on files that a Batch program (JOB, BATCH, etc.) is trying to open has been raised from 30 seconds to 60 seconds.

Message Accept State: Batch no longer resets the user's message acceptance state when it needs to send a message to the system console. Therefore, the message:

(Batch) I have reset your message state to -ACCEPT.

no longer exists.

Held Jobs in Queue: When a queue contains only held jobs, other queues will now still initiate Batch jobs (POLER #37750).

Multiple Monitors: The checking for multiple Batch monitors being spawned will now more reliably produce the "Multiple monitors illegal" error message, rather than a "File in use" error on the "O_LOG" file in BATCHQ.

Note

If a job is submitted from a passworded directory (including your own), the -HOME option must be used. The password must be included in the pathname, and the pathname must be enclosed in single quotation marks. For example:

JOB filename -HOME 'dir-name password'

CMPF — Problems Fixed

Closing Files: CMPF will now close files by unit number instead of by filename.

CPL -- Problems Fixed

Echoing: When echoing is enabled, comments and null lines will no longer be echoed. Null lines will be inserted into &DATA temporary files, but comments will not.

&ARGS: The &ARGS directive now explicitly rejects numeric option arguments (for example, those of the form "-123").

Non-local Goto: A CPL nonlocal &GOTO from a CPL on-unit to a "START <address>" command now works (POLER #41507).

EDITOR — Problems Fixed

CHANGE Command: The C/ //G command now works correctly when applied to a line that ends with a space (POLERS #29369, 40212, 82493).

OOPS Command: The command sequence D;N;OOPS now works correctly. That is, the OOPS returns the pointer to the position it was in before the N (POLERS #33936, 34683, 34837).

Extraneous Lines: Moving the pointer around a file with lines containing many blanks no longer causes ED to create extraneous lines (POLERS #37202, 45579).

MODE Command: Typing MODE with an illegal parameter now results in a BAD MODE error message (POLERS #33128, 80479).

WHERE Command: A problem that was sometimes causing the WHERE command to abort the Editor has been corrected (POLER #82205).

FILE Command: The FILE command no longer requires DELETE access on the specified file. Before Rev. 19.0, delete access was required to truncate the file (since it may have become shorter as a result of editing the file). As of Rev. 19.0, the file system allows truncation of a file if the user has Write access; therefore, a FILE command may be issued to a file to which the user has RW (Read and Write) access (POLER #29963).

FUTIL — Problems Fixed

Fatal Errors: FUTIL now returns a severity code in the event of a fatal error.

Erroneous FROM Commands: When a FROM command causes FUTIL to report a syntax error, FUTIL now correctly resets the FROM-name to the current directory (*). Subsequent LISTF commands produce the correct names at the top-level BEGIN and END points (POLER #21145).

Passwords: FUTIL does not automatically convert passwords to uppercase. A warning to that effect is now issued the first time the user enters a password containing lowercase characters during a FUTIL session. The warning message is as follows:

Note: a password with lower-case characters will not be converted to upper-case by FUTIL.

This warning is for informational purposes only; the command that elicits it is still executed (POLER #22245).

CLEAN Command: The CLEAN command no longer resets protection on files below the current level to 7 0. Protection is reset to the original values (POLER #24563).

File Units: When invoked, FUTIL no longer closes any file units. This correction allows FUTIL commands to be issued from within nested command files. Instead of closing file units, FUTIL finds units that are free and allocates them for itself. If FUTIL does not find at least six free file units, it issues the message, "All file units in use. I need at least 6 (FUTIL)." Under PRIMOS II, the corresponding message is, "ERROR CODE 41. I need at least 6 (FUTIL)." In any case, FUTIL uses 14 file units at most (POLER #15842).

COPY Command: The file types of all copied files are now preserved correctly (POLER #14942).

Comments: FUTIL now treats any command beginning with either * or /* as a comment.

FROM, TO, and ATTACH Commands: FUTIL now finds the correct volume when a volume name is included in a FROM, TO, or ATTACH command.

PRIMOS II: FUTIL no longer elicits a PRIMOS II "Beginning of File" error when sizing a DAM file under PRIMOS II.

LOAD — Problems Fixed

Return Code: LOAD will now set the warning flag and return code appropriately.

LOGPRT -- Problems Fixed

DELETE Option: The DELETE option now correctly spools the output file before deleting it.

HELP Display: The HELP display now uses screen scrolling. Typing any character(s) except uppercase or lowercase q, qu, qui, or quit continues the display.

DSWPARITY: In messages about DSWPARITY, what used to appear as "D board" now appears as "J board".

DSWPARITY checks are now performed for 850 processors as well as 750.

LFERNEXT: The LFERNEXT bit, which is bit 22 of DSWPARITY, is now correctly interpreted with respect to its meaning.

MAGNET -- Problems Fixed

Zero LRECL: Using objects where LRECL is set to zero no longer causes an abnormal return to PRIMOS command level.

MAGSAV/MAGRST — Problems Fixed

Specifying Tape Units: The erase and kill characters can now be used when a tape unit number is input from the terminal.

If the specified tape unit is not assigned, the message "Device not assigned. Type 'S' to continue" is displayed, and the user is returned to PRIMOS. Typing 'S' causes the "UNIT NUMBER" prompt to be repeated so that the save/restore process can continue.

"Wrong Tape" Message: A multi-reel tape can now be searched for a logical tape that is not on the first reel without eliciting the "Wrong tape" error message.

Date Time Stamp: MAGRST now correctly sets the DIM on files restored from tape. It also sets the DIM and protection on UFDs if they do not already exist.

Open UFDs: MAGRST no longer leaves the current UFD open after checking to see whether it is the MFD (POLER #40596).

Write Error Handling: If an unrecoverable write error occurs in MAGSAV, a message is now produced to inform you of the error recovery action taken.

Error recovery in MAGSAV consists of restarting the save at the last "checkpoint". Checkpoints occur:

- At the beginning of the logical tape
- At the beginning of the continuation reel
- At the last "NAME OR COMMAND" prompt

MAGSAV can only recover the save to the closest checkpoint. Thus, if more than one answer has been given to the "NAME OR COMMAND" prompt since the start of the current reel or logical tape, MAGSAV cannot recover the whole save, but can only restart using the last response to "NAME OR COMMAND".

After an unrecoverable error, MAGSAV produces one of three error recovery messages, depending on which type of checkpoint is being used:

- If the reel number is 1 and there is only one "NAME OR COMMAND" answer since the start of the logical tape, the message is "Restarting current logical tape".

- If the reel number is greater than 1 and there is only one "NAME OR COMMAND" answer since the beginning of the current reel, the message is "Restarting current reel (reel n)", where n is the current reel number.
- If there has been more than one answer to "NAME OR COMMAND" during the current reel, the message is:

****WARNING****

Unable to recover to beginning.

Restarting at name <answer to last prompt>

If you continue, you will have to keep the Reel which failed.

In this case, the failed reel will contain some of the save, and thus must be kept even though it is not complete. An alternative is to restart the entire save.

\$A Command: The default action of the \$A command is now to search all disks rather than just logical device 0 (POLER #37054).

Magnetic Tape Boot: The magnetic tape boot program has been changed to have the default system console speed set to 300 baud instead of 110 baud.

If the magnetic tape boot is used the restore a DOS runfile (normally *DOS64), then setting switch 13 (or adding '10 on a VCP) will cause the boot to restore the file, relocate DOS, patch the system console speed settings in DOS from its own values, and start DOS at the correct place. Therefore, when booting from magnetic tape, BOOT 15 should be used rather than BOOT 5. (POLER #48252).

MAKE — Problems Fixed

Badspots: MAKE will continue processing even if an encountered bad spot could not be entered into the BADSPT file.

The number of badspots will now be reset when the answer to the "PARAMETERS OK?" question is "NO".

Clarified Question: The question "80 OR 300MB STORAGE MOD" has been changed to read "STORAGE MODULE OR CMD" for purposes of clarity.

PHYSAV/PHYRST — Problems Fixed

End of Tape During GAP: PHYSAV will now recover correctly if it encounters an End of Tape when performing a GAP operation during error recovery; it will continue onto the next tape with the same logical tape number.

REN Command: PHYSAV now works if the user hits the BREAK key and types "REN" after the question "END OF REEL, MOUNT REEL", "UNIT NO:" is output.

FIX_DISK: PHYRST will no longer tell the user to run FIX_DISK while in verify mode.

PRIMOS II — Problems Fixed

Tape Drive Density: PRIMOS II now initializes model 3 1600/6250 BPI Capable Magtape drives so that the front panel density selection switch is enabled.

SEG — Problems Fixed

CMDSEG Rewritten: CMDSEG has been rewritten at Rev. 19.0. It has an improved user interface.

SPOOL -- Problems Fixed

Implied -OPEN: The SPOOL program no longer treats a "SPOOL" command with no arguments as an implicit "SPOOL -OPEN". Now, one of four things must be specified on a SPOOL command line:

- a treename to spool
- a "-LIST" option
- a "-CANCEL" option
- an "-OPEN" option

If none of these is specified, a helpful message is printed, and the error message "Missing argument to command. Filename required (SPOOL)" is generated.

Large Files: If a file that is larger than 32,767 records is spooled, its size will be recorded as 32,767 records regardless of how large it actually is. The size will no longer wrap around to negative numbers.

Slash Character: The slash (/) character, which is a legal filename character, is now printed in the banner section of the header pages, rather than being replaced by a blank.

SUBROUTINES — Problems Fixed

A\$FLOW: A missing key, A\$FLOW, has been inserted into
SYSCOM>A\$KEYS.INS.PL1 (POLER #29597).

UNIT\$A: UNIT\$A now returns .FALSE. on a bad unit number (POLER
#33282).

CHAPTER 16

DATA MANAGEMENT SYSTEMS

DBMS -- Problems Fixed

DMLCP: If an owner is stored using a subschema that does not include all owned sets, a subsequent FIND OWNER using a subschema that does include all owned sets now updates set currency correctly (POLERS #40557, 45202).

After deletion of a record that is the last member of an ORDER NEXT set occurrence, the user no longer receives an internal fatal error when a subsequent record of the same type is stored and inserted into the same set occurrence (POLER #41492).

DMLCP is now able to read or write addresses greater than 32K bytes in the user work area. Only Rev. 18.2 FIN dml programs were affected by this problem.

DBMS no longer gets into an infinite error loop when a fatal error is encountered.

Set sort orders are now correctly maintained. The new search algorithm may yield up to 15% improvement in searches of large sets (POLER #20941).

Concurrency errors will no longer occur due to data being retained across transactions (POLER #40402).

DBUTIL: Switching from an area to a set or from one list to another no longer displays useless information (POLER #27966).

After the DBUTIL editor is used to patch a set, the modified data set is now available, so the issuance of another set command is not required.

DBUTIL no longer gives incorrect statistics during a DUMP AFTER.

DBACP: DBACP now packs record fragments from most recent to oldest within a bucket, ensuring that the current fragment is chosen (POLER #47650).

Although update transaction numbers as a group and read transaction numbers as another group are unique, update and read transaction numbers considered together are not unique. After-image recovery has been corrected to screen out retrieval transactions, thus ensuring valid roll forward capability.

After-imaging is now correctly turned off following a PACK or EXPAND of a data base (POLERS #32193, 32192).

CDML/FDML: All keywords are now treated as reserved words in DML, whether they are required or otherwise. For example, the word "OTHER" is a keyword in the "ON ERROR" clause and is consequently reserved. Therefore, use of "OTHER" as a field name will correctly generate a fatal error (POLER #37464).

CDML now generates the correct error messages when an area name cannot be located via a specific OPEN statement (POLER #41434).

CDML will now report the maximum number of data items allowed, as well as how many were found, in a FETCH in the DML statement (POLER #32202).

CDML now accepts "ON ERROR" clause paragraph names that begin with digits (POLER #12613).

An FDML compilation no longer produces an L_ file; therefore such a file is not left open if it encounters errors (POLER #20712).

Both CDML and FDML will now close all files under normal and error conditions (POLER #32346).

The maximum number of arguments for DMLCP is now 64. If this number of arguments is exceeded, error message 30F will now be generated (POLERS #41442, 41617).

CSUBS: Nested naming groups are now chunked appropriately (POLER #34490).

CLUP: CLUP now closes only those file units (excluding 127, comoutput unit) that have the pathname prefix "<some_volume_name>PDBMS". In particular, this allows CLUP to be run from a CPL file.

Notes

If the user opens files between the time the DBMS program ends and the time CLUP is run, CLUP may not have enough available file units to do the cleanup.

If CLUP is run from a CPL file that resides in the PDBMS UFD, that CPL file will also be closed (POLERS #40184, 35558).

DBMS/QUERY -- Problems Fixed

SELECT Command: When using the SELECT command, where the underlying base record is in more than 9 areas, DBMS error 2710F is no longer produced. The new limit is now 15 areas (POLER #36385).

HELP Data Base: The HELP data base has been updated to include ABBREV, BREAK, FORMAT, LIST, PROCEDURE, SCROLL, TERMINAL, VERIFY, CREATE, DELETE, DISABLE, EDIT, ENABLE, RENAME, COPY, and TABLE (POLER #40185).

BREAK Key: If a user pressed the BREAK key during a Report Generator sort, the table being sorted was destroyed and the files created by the sort routines were left open and not deleted. This problem has been corrected.

PICTURE Clause: The Report Generator no longer prints items of data type PICTURE "V999" one column too far to the right during a tabular display.

DBMS/QUERY no longer prints a null picture string when asked to describe an item of data type PICTURE "V999" or to describe a table containing an item of that data type.

DBMS/QUERY no longer generates a fatal error when displaying a PICTURE "V9999" field (POLER #40933).

Editor LOAD Function: The DBMS/QUERY editor LOAD function now works correctly (POLERS #48035, 48044).

Block Detail: Block detail now allows use of position 1 of the detail line (POLER #45577).

Cover Item on Line 0: The Report Generator no longer accepts items on the cover specified to be on line 0. Previously, it was accepting such specifications and placing the items on line 1.

MIDAS — Problems Fixed

GDATA\$: The GDATA\$ routine was returning an EOF error when it reached the end of the first data segment, instead of attempting to open a succeeding segment. This problem has been corrected (POLER #43079).

GDATA\$ now correctly returns a truncated record when the buffer size (specified in bytes) is between one-half and one times the actual data record length.

PRIME/POWER — Problems Fixed

Scrolling: Scrolling is no longer disabled after a SCREEN function on the PT65 (POLER #43029).

*REORG: The *REORG on the Master Disk had to be rebuilt before it could be used. This problem has been corrected (POLER #33285).

Combining Sets: the "Warning - line truncated" message is no longer displayed when combining sets (POLER #35382).

The correct number of entries is now generated on a combine (POLER #35383).

Compute With No Sets: A Fortran I/O Error no longer occurs as a result of a compute with no sets available (POLER #11983).

Find on Long Integer: A FIND on a long integer no longer gives incorrect results (POLERS #11982, 20786).

Change Descriptor Name: A Change descriptor name followed by a change description no longer corrupts the filename (POLER #82294).

Batch Add File: When a character descriptor is missing from a Batch Add file, POWER no longer inserts the value from the previously added record (POLER #36763).

Change Descriptor Error: Occurance of an error in Change Descriptor no longer prevents previous changes from being made (POLER #82285).

Comment Line: After processing a comment line in a procedure, POWER will now issue a prompt (POLER #25397).

Reports: In reports suppressing duplicate numeric variables, the output of variables is now correct (POLER #32173).

Zero Title Lines: Specifying no title lines no longer ruins the first line of the heading (POLER #32818).

List Display: Member linked fields are no longer offset in a list display (POLER #82023).

Validate: Validate now works properly when using more than 51 numeric fields (POLER #36521).

Modifying Reports: Reports with no title lines and/or numeric descriptors can now be modified (POLER #37513).

Find on Character Field: An inequal FIND on a character field no longer returns "equal" (POLER #82202).

\$FILL: When \$FILL is entered after an erroneous entry in validation mode, an incorrect field is no longer added (POLER #81600).

Blank Date: The blank date indicator of "9999" can now be suppressed in a report, although "9999" will still appear in a DISPLAY (POLER #36242).

Compute in Date Field: The Compute verb no longer inserts a month in a date field containing only a year (POLER #34346).

Spool Files: POWER no longer creates null or incorrect spool names for spooled files (POLER #82128).

Report Create: The user no longer has to know how many characters a variable used in the heading will have at Report Create time (POLER #35804).

CHAPTER 17

FORMS

FORMS — Problems Fixed

Delete Character Function: The D-CHAR key on a PRIME PT45 now works correctly (POLER #33295).

Insert Character Function: The I-CHAR is now correctly switched off so that the screen is not corrupted when output is sent to the terminal (POLER #36359).

CHAPTER 18

COMMUNICATIONS

DPTX — Problems Fixed

OWLDSC Command: The OWLDSC command no longer leaves the keyboard locked when it receives a "transmission failed" message from BD\$INP (POLER #35639).

Bad Dim Data Error: The receiver is now re-enabled on a "Bad Dim Data" error.

No Host Response: If the host does not respond with an ACK or a NAK to text messages sent by the emulator, ENQ messages are now sent.

Remote Timeout: When the remote end times out, receives will no longer be retried, so that the protocol handler will immediately recognize the timeout condition.

Logged-out Lines: Logged-out lines are now correctly recognized as being logged out.

SYNC in Text Field: The emulator will now handle a data stream that contains a SYNC character embedded in a text field (POLER #43856).

Short Read AID: The emulator will now send a completed read data stream when a short read AID is outstanding and a read command is issued (POLER #32431).

Force-logout On Queue Full: The emulator will now allow a force-logout to occur when a queue full condition exists.

Keyboard Unlocked: The keyboard is now unlocked when a NAK is received while the emulator is in Response Outstanding mode (POLER #23272).

Powered Off Device: The Traffic Manager will no longer continue selecting a device that is powered off. It will now wait for a DE status to be received before selecting it again.

Non-configured Device: If the Traffic Manager receives an AID for a non-configured device, it will now discard it, rather than mark the control unit down.

Attribute Array Overflow: The attribute array can no longer overflow. Previously, an Illegal Segment Number error occurred when it overflowed (POLER #28601).

PRIMENET — Problems Fixed

X\$KEYS: A PL/I version of the X\$KEYS insert file (named X\$KEYS.INS.PL1) has been added to SYSCOM.

Protocol Errors: Several problems with using NETLINK to non-PRIME host systems because of protocol errors have been fixed (POLER #32437).

32K-Byte Files: NETLINK can now handle files longer than 32K bytes.

FAM SGDR\$\$: All keys to SGDR\$\$ now work through FAM II.

Slaves Run After Setting Time: Slaves are no longer allowed to run until the first SETIME command is issued from the system console.

ADDISK -RENAME: The ADDISK -RENAME command, issued from the system console, no longer crashes the system.

Error Codes: Error codes are now more reliably reported (via FAM II) by file system subroutine calls that occur on a different node.

Remote Command Output Files: Remote command output files no longer cause a user to hang if logout happens before a "COMO -END" is issued.

No FAM I Nodes: FAM I now checks to see if any nodes are configured for it to talk to when it starts up. If no nodes are configured, it prints an explanatory message at the console and logs out.

PDN Queries in NETCFG: The NETCFG program has been changed to ask for the number of virtual circuits and the default window and packet sizes for each line, for all Public Data Networks supported (POLERS #27592, 27602).

NETCFG Correction: All references to "PSS" were changed to "IPSS".

New Network Logging Events: When the catchall error E\$NETE is returned by FAM II as a result of accessing a resource on a remote system, additional information may be recorded in the network event logging file. Network event logging files now reside in PRIMENET*. There are five new events that can be recorded in the network event log file as a result of a software-detected network error. An E\$NETE error could also have caused one of these new events to be recorded. The LOGPRT program in the TOOLS directory may be used to peruse event log files. (See Chapter 11.)

Type-ahead in NETLINK: When a call is pending as a result of a C or NC command to NETLINK, and the "sysnam Connected" message has not yet been output, type-ahead is now accepted. To escape to command mode, use the break or control-P key.

Reverse Charge Flag: The reverse charge flag for open virtual circuits is now correct (POLER #37575).

RJE (REMOTE JOB ENTRY) PRODUCTS — Problems FixedCARDSPOOL

Lowercase Characters: CARDSPOOL can now handle lowercase characters correctly.

1004

Decompression: Decompression of print and punch files is now handled correctly (POLER #32662).

GRIS

Mixed Media Files: Mixed media receive files are now processed correctly (POLER #23814).

HASP

512 Byte Block Size: HASP can now be run at full 512 byte block size (POLER #21681).

Error Message: The HASP symbiont no longer aborts with an error message specifying error code 26 (POLER #23223).

One-block Files: One-block files will no longer be incorrectly deleted (POLER #29181).

Recovering Line: The error message "E005: file in use" will no longer appear when recovering the line (POLER #31744).

Punch Binary: Receiving a punch file with the punch binary option is now handled correctly (POLER #31855).

Switching VFC: The switching of VFC files is now correctly tracked between untranslated files (POLER #37438).

Operator Messages: Operator messages are no longer being ignored when "T" files are in the QHASP UFD (POLER #37937).

Concat Files: The error message "Bad T File" will no longer be seen on concat files, as the logic that calculated the length of a concat file now works (POLER #40046).

Host Disconnect: A retry count has been added. This count will cause a message to be displayed if the count is exceeded without getting a reply from the host. This will allow the user to know if the host has disconnected (POLER #37595).

X80

Lost Blocks: Problems with occasionally losing blocks have been fixed (POLER #14804).

Component Selection: Component selection in ASCII files is now correctly handled (POLERS #23735, 45553).